Final report

OWMC
Ontario
Waste Management
Corporation

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eda
collaborative
inc.

SITE ASSESSMENT
PHASE 4B:
VISUAL IMPACT

Prepared for
The Ontario Waste Management Corporation

Submitted By

E.D.A. Collaborative Inc.

September, 1987

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September 23, 1987

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Attention: Ms. B.J. Sakauye

Re: Site Assessment Phase 4B: Visual Impact

We are pleased to submit our final report concerning the Visual Impact Assessment for Phase 4B.

This report documents the findings of our visual impact study carried out on OWMC's proposed industrial waste treatment and disposal facility at the Preferred Site in the Township of West Lincoln.

The potential visual impacts have been identified for the construction, operational and decommissioning phases of the facility. In addition, a range of mitigation measures have been identified to minimize those potential impacts.

Yours very truly,
EDA COLLABORATIVE INC.

Bruce Cudmore
Principal

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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

1.0 Purpose

At the request of the Ontario Waste Management Corporation, EDA Collaborative has undertaken the assessment and documentation of the visual impact of constructing and operating an industrial waste treatment and disposal facility on the preferred site selected in Phase 4A.

The objectives of Phase 4B Site Assessment were:

.1 Define the existing environmental conditions (baseline) of the preferred siting option.

.2 Predict and assess potential risks and impacts that may be associated with the proposed facility design, operations and decommissioning.

.3 Identify and develop appropriate mitigative measures to minimize the potential risks and impacts associated with the proposed facility design, operations and decommissioning.

.4 Identify monitoring programs to assess the effectiveness of the design and operations in minimizing risks and impacts and to determine the effectiveness of mitigation measures.

.5 Interpret the residual impacts after mitigation.

.6 Prepare documentation to meet the requirements of Ontario's Environmental Assessment Act.

2.0 Scope and Methodology

In order to address the purpose and objectives of the study a methodology was developed that would provide factual data which could be used to predict the visual impact of the facility at its proposed location.

The approach taken to accomplish this task included the following steps:

.1 Site and facility familiarization.

.2 Documentation and analysis of existing visual conditions on-site and off-site.

.3 Documentation and analysis of the simulated facility at the preferred location.

.4 Documentation and analysis of visual impact on-site and off-site for the simulated facility.

.5 Various mitigation options were tested and evaluated for the simulated facility.

The analysis undertaken in this study utilized graphic documentation, photography, field observations of the site and graphic overlay analysis techniques. The approach and technique used were adequate for evaluation and prediction purposes.

The analyses undertaken during this assessment were based on two areas of concern:

- Visual impacts of proposed facility on site vicinity and residents.
- Visual impacts of proposed facility on region and non-residents.

The analysis used to investigate impacts on the local environs and residents included:

- change in visual character.
- change in visual quality.
- intrusion on surrounding households and land areas.

The analyses used to investigate impacts on the region and non-residents included:

- Intrusion or appeal to passing traffic.

The following set of analyses were carried out with various mitigative measures at a detailed level to predict residual impacts:

- Mitigative options.
- Net impacts.

3.0 Premises and Postulates

In order to assess the visual impact of the proposed facility assumptions were made regarding the type and extent of development at the site.

Premises

The consultant was provided with Facility Characteristics Assumptions information from the Monenco Phase 4B Facility Characteristics, 1987 which formed the basis of this report.

Postulates

The following assumptions were made by the visual consultant during the development and application of the visual assessment:

.1 Households and community features located outside the site acquisition boundary would not be displaced in the event of facility development.

.2 Visual impacts would be greatest close to the facility where unobstructed views are possible and would dissipate over distance.

.3 Where commitments to the application of mitigative measures were made, they were incorporated in the analysis.

.4 The detailed analysis was conducted for the proposed facility in its operational phase.

.5 Where the level of visual impact could not be precisely determined, this study allocated the higher impact.

4.0 Status of Data

This study used factual data and quantitative analysis techniques as much as possible to evaluate the facility siting. Some qualitative interpretations were also employed to explore the fit between the facility and the surrounding landscape.

The types of data used in the analyses for this study included the following:

- 1:50,000 scale mapping was used for the regional context.
- 1:10,000 scale mapping was used for the community and site vicinity analysis.
- 1:2,000 scale mapping was used for the site proper and immediate site vicinity analysis.
- aerial photography was used to confirm woodlots, hedgerows, and building locations.
- topography, landforms, soils, drainage, vegetation types and species distribution were identified based on Phase 4B physical study reports.
- significant tree mass locations and heights were confirmed through field observations and mapped at the appropriate scale.
- 14 representative viewing locations in relation to the site were identified and documented photographically (colour prints and colour slides) during two different seasons with and without the simulated facility.
- other data such as traffic volumes and land uses were also used from the Phase 4B study reports.

5.0 Main Findings

Each of the representative viewing point photographs was used to measure the character and visual quality of the existing site proper and site vicinity with and without the facility. The final product was an assessment of the visual impact that the facility would potentially create based on changes in the visual quality and character of the site.

The visual character was measured by evaluating each of the representative viewing points based on the main features of form, line, colour and texture. These results were given numerical values and averaged to give an evaluation of the character for the site vicinity. The results of existing visual conditions were compiled and are as follows:

.1 The sky comprises the dominant form and dominant colour source.

.2 Short vertical and long oblique lines are dominating.

.3 Textures are relatively insignificant.

The visual quality was measured by evaluating each of the representative viewing points based on the main features of landform, vegetation, water, colour, adjacent scenery, scarcity and cultural modifications. These results were again given numerical values and averaged to produce a rating of the visual quality for the site vicinity. The overall visual quality of the existing conditions was rated as Moderately High (representing 3 on a scale of 1 - 7 with 1 being Very High) since it does not represent a particularly vivid rural landscape but is intact and unified.

The representative viewing points were then evaluated with the simulated facility in place. This was accomplished by measuring the Degree of Visibility and the Degree of Contrast and determining a Contrast Rating for each viewing point.

At the same time the proposed facility was superimposed on the existing landscape and a detailed viewshed was graphically constructed for the facility throughout the surrounding landscape.

The Contrast Ratings were combined with the Viewshed mapping to determine three Visual Impact Zones for the facility: high, moderate and low. These zones were later used to evaluate the potential effectiveness of proposed mitigation measures. The impact zones identified are as follows:

High - extends from 0 to .8 km from the site and occasionally beyond where the landscape is particularly open and clear views.

Moderate - generally extends from .8 to 2.0 km and occasionally closer than .8 where parts of the facility are screened.

Low	-	extends beyond the 2.0 km distance out to 5.0 km from the site. In some cases where existing screening was particularly effective this zone falls within the 2.0 km distance.

Beyond the 5.0 km distance from the site, it was determined that the contrasts were very low or virtually non-existent.

Following documentation of the impact zones the different areas were analysed on a quantitative and qualitative basis. The quantitative changes consisted of counting number of residents, the land areas and the roads exposed in each zone. The qualitative changes to the visual environment are broken down into visual character and visual quality changes. The visual quality would potentially drop to Moderately Low with the introduction of the facility.

6.0 Impact Predictions and Mitigation Measures

Without mitigation, moderation of the visual impacts would be minimal. It is possible that the maturing of existing woodlots and the reduction of viewer sensitivity would moderate these impacts to some extent. The actual areas of exposure, degree of visibility and contrast ratings are not expected to change.

Mitigation measures may be undertaken to control qualitative changes in the visual environment as well as screening of the facility. These would potentially reduce the contrast of the proposed facility as well as the numbers of people and areas exposed to it.

Through the addition of screening (for example, trees, berms etc.) much of the high impact area may be reduced to a moderate impact. As well, reductions may be possible in the extent of exposure of certain households, areas of agricultural lands and passing traffic. While improvements may be achieved toward reducing the exposure of households, land areas and traffic, it is unrealistic to expect that the facility can be totally hidden. However, through enhancements to the visual setting achieved through site design, screening with vegetation as well as other forms of mitigation, the facility will contrast less with its surrounding area.

7.0 Conclusions and Recommendations

This study has determined that the facility will have an impact on the existing, surrounding landscape from a visual standpoint. These impacts emphasize the need for mitigation measures to manage the visual changes and moderate their effects. The mitigation of these changes should be carried out using measures that are sympathetic and consistent with the existing visual character of the area. The expected visual impacts, with proper mitigation, would represent acceptable impacts in this landscape.

It is also recommended that this study form the basis of an ongoing monitoring process of the visual changes that take place over the construction period, operating life and decommissioning of the proposed facility. The main component of this monitoring program would be the systematic updating of the photographic records from the representative viewing points.

The results of the comparison of the actual and predicted findings should be used as a basis for decision-making regarding modifications to the mitigation measures, if required.

PHASE 4B

VISUAL IMPACT ASSESSMENT OF THE PREFERRED SITE

1.0 INTRODUCTION

1.1 Purpose

This report documents the visual impact studies carried out as part of Phase 4B of the Ontario Waste Management Corporation's (OWMC) Facilities Development Process. Phase 4B involved detailed assessments of the Preferred Site and surrounding area based on several disciplines.

The specific objectives of the Phase 4B site assessment were to:

1. Define the existing environmental conditions (baseline) of the preferred siting option.
2. Predict and assess potential risks and impacts that may be associated with the proposed facility design, operations and decommissioning of the site.
3. Identify and develop appropriate mitigative measures to minimize the potential risks and impacts associated with the proposed facility design, operations and decommissioning.
4. Identify and develop monitoring programs that will be implemented to assess the effectiveness of the design and operations in minimizing risks and impacts.
5. Interpret the residual impacts after mitigation.
6. Prepare documentation to meet the requirements of Ontario's Environmental Assessment Act.

For visual impact, the Phase 4B studies have focused on predicting the changes in visual quality and in visual character within the site vicinity with the introduction of the OWMC facility. This study evaluates the existing visual condition of the area and predicts the future condition with the facility in place. Accordingly, this report: Site Assessment Phase 4B Visual Impact:

- Documents the existing state of visual assessment for on-site and off-site impacts.
- Considers the visual impact component of the Phase 4A site selection process in relation to the enhanced level of data and design refinements available for Phase 4B.

- Documents the impacts on visual impacts of the area associated with development and operation of the proposed facilities, together with recommended mitigative measures and a monitoring program.

Figure 1 illustrates the Facilities Development Process and Figure 2 illustrates the Preferred Site Location.

1.2 Study Areas

The following study areas were identified in Phase 4A and are carried forward into this phase for further refinement and definition:

1. Preferred Site Proper - as to the physical and visual changes that will occur as a direct result of the construction of the facility on the site area of 124 ha.

2. Site Vicinity - as to the changes that will occur as a result of views to the facility from within two zones as measured from the site boundary:

foreground	0 - .8 km
middleground	.8 - 5 km

3. Regional Areas - as to the changes that will occur as a result of the presence of the facility in the background landscape (beyond 5 km).

1.3 Time Horizons - Phase 4B

The following time periods have been identified for this study:

1. Pre-Construction - includes the time when existing conditions have been documented.

2. Construction - includes the time from commencement to completion of the construction of the 150,000 tonne facility.

3. Operations - includes time up to and including the handling of 150,000 tonne per year based on the following incremental growth:

Year of Operation	Total Waste Quantities
1	50,000
5	150,000
10	300,000

- impacts are assessed with and without the application of mitigation measures.

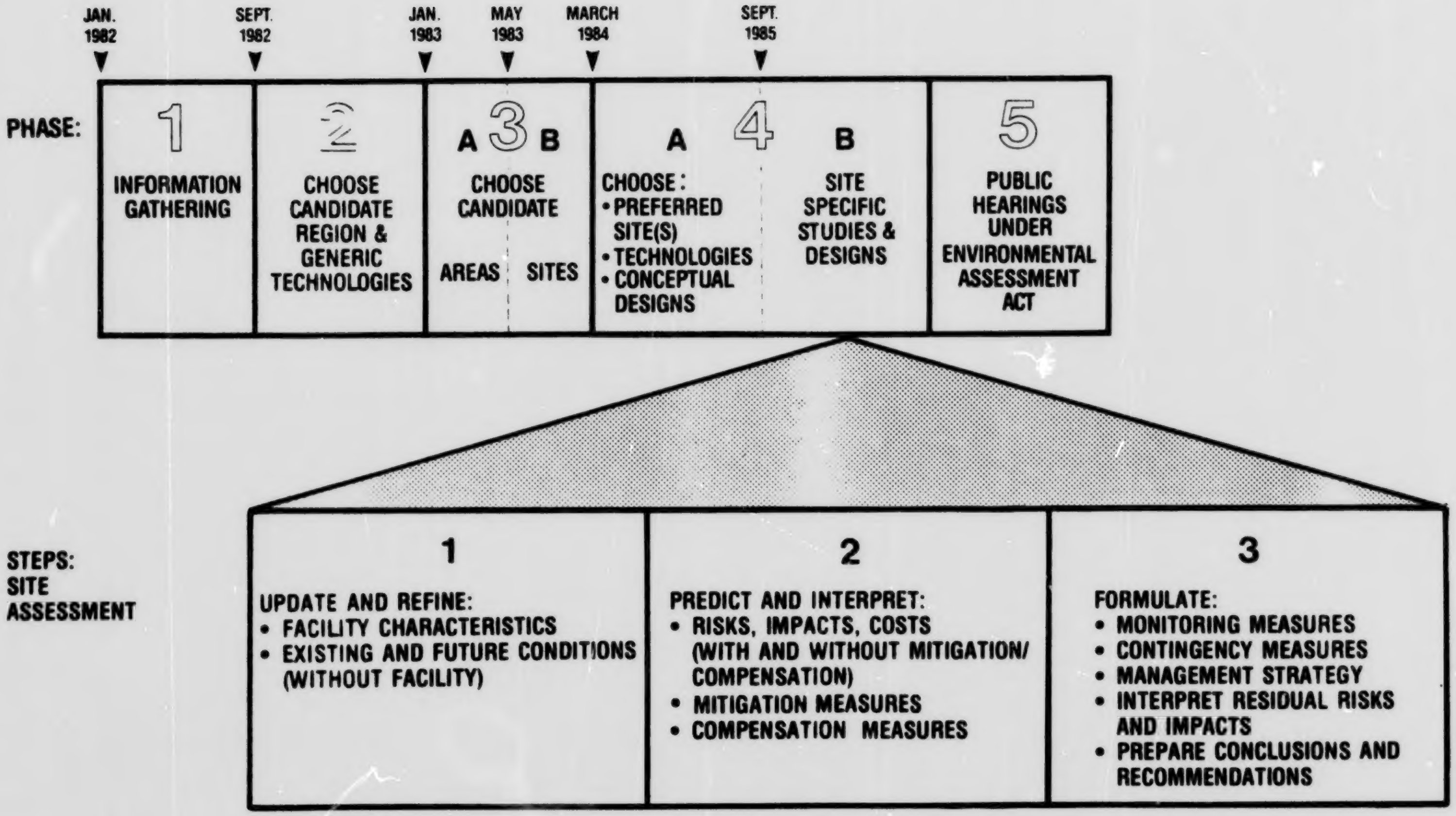
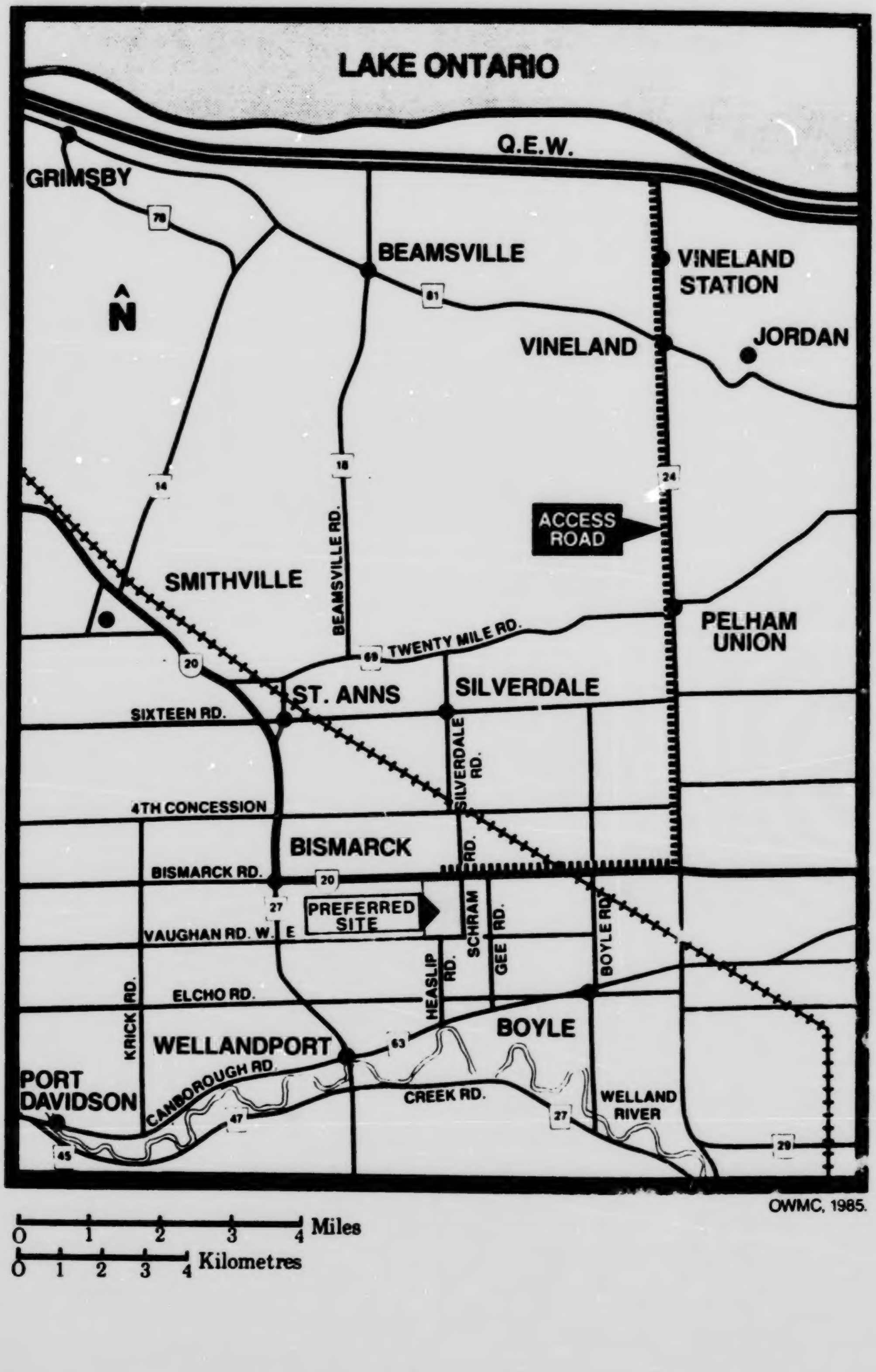

JAN. 1982
SEPT. 1982
JAN. 1983
MAY 1983
MARCH 1984
SEPT. 1985
PHASE:
1
INFORMATION GATHERING
2
CHOOSE CANDIDATE REGION & GENERIC TECHNOLOGIES
A 3 B
CHOOSE CANDIDATE
AREAS
SITES
A 4 B
CHOOSE:
• PREFERRED SITE(S)
• TECHNOLOGIES
• CONCEPTUAL DESIGNS
SITE SPECIFIC STUDIES & DESIGNS
5
PUBLIC HEARINGS UNDER ENVIRONMENTAL ASSESSMENT ACT
STEPS: SITE ASSESSMENT
1
UPDATE AND REFINE:
• FACILITY CHARACTERISTICS
• EXISTING AND FUTURE CONDITIONS (WITHOUT FACILITY)
2
PREDICT AND INTERPRET:
• RISKS, IMPACTS, COSTS (WITH AND WITHOUT MITIGATION/ COMPENSATION)
• MITIGATION MEASURES
• COMPENSATION MEASURES
3
FORMULATE:
• MONITORING MEASURES
• CONTINGENCY MEASURES
• MANAGEMENT STRATEGY
• INTERPRET RESIDUAL RISKS AND IMPACTS
• PREPARE CONCLUSIONS AND RECOMMENDATIONS

FIGURE 1
Facilities Development Process

Figure 2
Preferred Site Location
Township of West Lincoln, Regional Municipality of Niagara. Local Detail.


LAKE ONTARIO
Q.E.W.
GRIMSBY
79
BEAMSVILLE
81
VINELAND STATION
VINELAND
JORDAN
N
14
18
24
ACCESS ROAD
BEAMSVILLE RD.
SMITHVILLE
PELHAM UNION
69
TWENTY MILE RD.
20
ST. ANNS
SILVERDALE
SIXTEEN RD.
SILVERDALE RD.
4TH CONCESSION
BISMARCK
BISMARCK RD.
20
27
PREFERRED SITE
VAUGHAN RD. W. E
RD.
SCHRAM
GEE RD.
BOYLE RD.
HEASLIP RD.
KRICK RD.
ELCHO RD.
BOYLE
WELLANDPORT
63
PORT DAVIDSON
CANBOROUGH RD.
CREEK RD.
47
27
WELLAND RIVER
45
29
0 1 2 3 4 Miles
0 1 2 3 4 Kilometres

OWMC, 1985.

4. Future Conditions - includes the time duration over which conditions are expected to change throughout the operating life of the facility as well as future conditions should the facility not be present.

1.4 **Report Format**

This report is broken down into two sections, Baseline Conditions and Predicted Changes/Mitigation. These report components are described as follows:

Baseline Conditions - describes the approach and methods utilized to identify the existing visual conditions on the site, in the vicinity and in the region. The existing conditions are described in detail. As well, a review of possible future visual conditions and the factors effecting those is included.

Predicted Changes - describes the procedures used to predict, evaluate and synthesize the visual changes. The impact factors and their ranking is described, as are the predicted changes themselves with and without mitigation. In conclusion, an overall review is carried out of the residual impacts and their degree of acceptability.

2.0 STUDY APPROACH AND METHODS

2.1 Assumptions

The following assumptions were made regarding the baseline conditions:

1. Baseline conditions as documented during the Phase 4A study, 1986, for the site, vicinity and community are representative of the present existing visual environment.

2. The site boundary is as defined in the Phase 4A part of the process.

3. The existing visual conditions in the site vicinity have come to their present state through incremental change in the rural landscape and all existing components are considered integral to the visual character of this landscape.

2.2 Parameters

The following parameters have been identified for the documentation of the baseline conditions:

1. Photographic documentation of the existing visual conditions has occurred at two representative seasons of the year. These include summer, with vegetation in full leaf and winter, with no leaves and no snow. Other seasons were considered but it was felt that the use of 2 seasons was adequate for this analysis.

2. Specific representative viewing points (1-14) were identified from which photographic documentation took place. These points are only representative and should not be taken as a standard for all possible points within the site vicinity.

2.3 Data Sources

This analysis has been carried out utilizing the following types of sources of information:

- OWMC technical reports from previous Phase 4A.

- primary data assembled during the previous study phase including maps, aerial photography etc.

- literature search consisting of a review of professional papers, reports, publications, books and unpublished papers;

- new mapping at 1:10,000 and 1:2,000 scales for Phase 4B;
- on-site and vicinity field work for Phase 4B;
- photographic records of existing conditions for Phase 4B.

2.4 Data Collection Procedures

The following data were collected concerning the visual baseline conditions for the site proper, site vicinity, community and regional areas:

1.	Mapping	. 1:50,000 scale mapping was used for the regional context which consists of the Niagara Peninsula.
		. 1:10,000 scale mapping was used for the community and site vicinity analysis.
		. 1:2,000 scale mapping was used for the site proper, and immediate site vicinity analysis.
2.	Aerial Photography	. aerial photography was used to confirm woodlots, hedgerows, building locations and quality assessments of vegetation as screening elements.
3.	Physical and Biological Conditions	. topography, landforms, soils, drainage, vegetation types and species distribution were identified based on Phase 4A bio-physical study reports and field observations.
		. the heights of existing vegetation masses were calculated from field work utilizing a hand- held inclinometer.
		. significant vegetation masses with screening potential were mapped with heights identified.
		. no significant existing landforms with screening potential were identified and consequently were not mapped.

4.	Cultural Modifications	. all dwellings in the immediate vicinity of the site were identified and located on the 1:2,000 scale mapping. . all houses, barns, open fields, roads and other features were taken into account on the 1:2,000 and 1:10,000 scale mapping.
5.	Representative Viewing Points	. several representative viewing points (see Figure 3) in relation to the site were identified based on the following criteria: - Distance: foreground (0-.8km) middleground (.8-5.0km) and background (over 5.0km.). - Aspect: north, east, south and west. . initially, 12 representative viewing points were located and utilized for the winter photography. (see Figure 4) . two additional representative viewing points were added for the summer photography (due to exposure to the facility) to make a total of 14 representative viewing points. (see Figure 5)
6.	Photography	. colour print photographs were taken from the representative viewing points for summer and winter seasons. . colour slide photographs were also taken from the representative viewing points for summer and winter seasons. . all photography was done using 55mm camera lenses which closely approximate the field of view of the human eye (i.e. 27).
7.	Facility Height Simulation	. two sets of 2 helium - filled balloons (one at 60 meters and one at 50 meters) were tethered at the location and height of the proposed facility and photographed during the summer of 1986.
8.	Other Data	. other data such as traffic volumes and land uses were brought forward from the Phase 4A work and updated as required.

2.5 Data Compilation and Analysis Procedures

Data from all the sources were assembled and analyzed to develop a clear assessment of existing visual baseline conditions for the site proper and site vicinity areas. The regional conditions were examined only at an overview level.

The regional overview was conducted and major visual features mapped at 1:50,000 scale. The features mapped included major landforms (Niagara escarpment), extensively vegetated areas (wooded areas along rivers, shores and the escarpment), water bodies and edges (lakeshores and major rivers) as well as significant cultural modifications (towns, cities and settlements). The results of this overview inventory were assessed as to their proximity, affects and inter-relations with the preferred site and its immediate vicinity.

The community overview consisted of locating the significant hedgerows and woodlots from the aerial photography and bio-physical reports and mapping the information at 1:10,000 scale. These maps were utilized to define the criteria for the selection of and actual locations of the representative viewing points in the landscape (see Figure 3). In addition, these maps served as bases for the definition of the first-order viewshed maps.

The first round of photography from the representative viewing points was carried out in the winter and the records catalogued (see Figure 4)*. At the same time, the records of the heights and screening effect of existing vegetation and buildings were documented.

The second round of photography from the representative viewing points was then carried out in the summer (see Figure 5). This field work also involved the tethering of the helium balloons on the site to simulate the heights and locations of key visual elements of the proposed facility. The balloons were photographed with the summer scenes. The photographic record of the locations and heights of the balloons in the scenes served as reference points for the simulation of the visibility of the proposed facility.

The representative scenes (both summer and winter) were then assessed for baseline visual character and visual quality. These assessments were documented in chart form with specific numerical values for further interpretation and comparison.

Residence locations and existing views were determined based on the sections and field work. More detailed existing conditions and features were also mapped at 1:2,000 scale for later use in the determination of specific viewsheds and impact zones.

* Winter photographs were not taken for location points 6 and 10 as these points were not included until the summer, after the winter photographs had been completed.

The historical perspective data were gathered and summarized by Historica Research Ltd. in their memorandum "Heritage Character of Landscape around Preferred Site" dated October, 1986 and interpreted for use in the visual study. (See Appendix E)

2.6 Visual Character Determination

Visual understanding of the environment is based on the visual character of features and their relationship to each other. The purpose of carrying out a visual character assessment is to provide a description of the existing visual environment and not to evaluate it as being "good" or "bad", "beautiful" or "ugly".

The two major attributes of visual character described in this study are pattern elements and pattern character. Pattern elements include form, line, colour and texture. Each of these aspects were evaluated as to their type and degree of presence in each of the representative scenes. This determination was carried out using a grid on an acetate overlay on each scene. The area of the main elements of the scenes were tabulated and total scores identified for each.

The higher level aspect of pattern character involves the expression of the pattern elements and is described as to dominance, scale, diversity and continuity. The attributes of dominance and diversity are included in the results of the grid square technique. The additional aspects of scale and continuity are included as comments, based on field observation, in the interpretation of the visual character.

The identification of visual character in this manner provides a thorough descriptive base from which predictions can be made. Utilizing this information base together with data generated through the assessment of the facility, the amount and extent of change in the visual character can be forecast from each of the representative viewing points as well as overall. The technique utilized to do this is termed the "Contrast Rating". This technique is described more fully in Section 4.7, Evaluation Procedures.

2.7 Visual Quality Determination

Visual quality refers to the degree of excellence of the visual resource. Landscape resources of high quality are not necessarily similar and can be very different. An urban scene such as the Toronto skyline as seen from the Leslie Street spit as well as the post card view of Lake Louise, Alberta both exhibit strong vertical relief yet horizontal scenes such as the Cape Cod beaches are also recognized for their high visual quality. The same can be true for rural Ontario landscapes. Some have high visual quality and some do not. The determination of visual quality however, is not purely a subjective or emotional exercise. Visual quality can be evaluated based on specific considerations.

The evaluative criteria used in this study are vividness, intactness and unity. These criteria are defined as follows:

Vividness:	a measure of the distinctiveness, and memorability of the landscape as experienced from the visual density and contrasts expressed in its main components of landform, vegetation, waterform. colour, adjacent scenery, scarcity and cultural modifications.
Intactness:	is the measure of the apparent visual integrity of the natural and man-made elements in the landscape: its freedom from visual encroachment and disruption.
Unity:	the measure of the degree to which natural and manmade elements of the landscape are compatible and form a harmonious and coherent visual whole.

In order to develop ratings for each of these three criteria, the representative view scenes were once again systematically scored, this time for quality. In each case, ratings were established for landform, vegetation, water, colour, adjacent scenery, scarcity and cultural modifications. The scoring system was based on the degree to which each of these features contributes to the quality of the scenery. The individual scores for each of these considerations were then used to establish values for vividness, intactness and unity.

The value for vividness was determined by adding the scores for each of the considerations and comparing the score to the total possible score. The scores were converted to percentages and then to a 1 - 7 scoring system ranging from very high to very low for easy comparison. The conversion table (Ady, et al, 1979) is shown below:

Very High	1	85.8 - 100%
High	2	71.5 - 85.8%
Moderately High	3	57.2 - 71.5%
Moderate	4	42.9 - 57.2%
Moderately Low	5	28.6 - 42.9%
Low	6	14.3 - 28.6%
Very Low	7	.0 - 14.3%

Figure 3 - Representative Viewing Point Locations

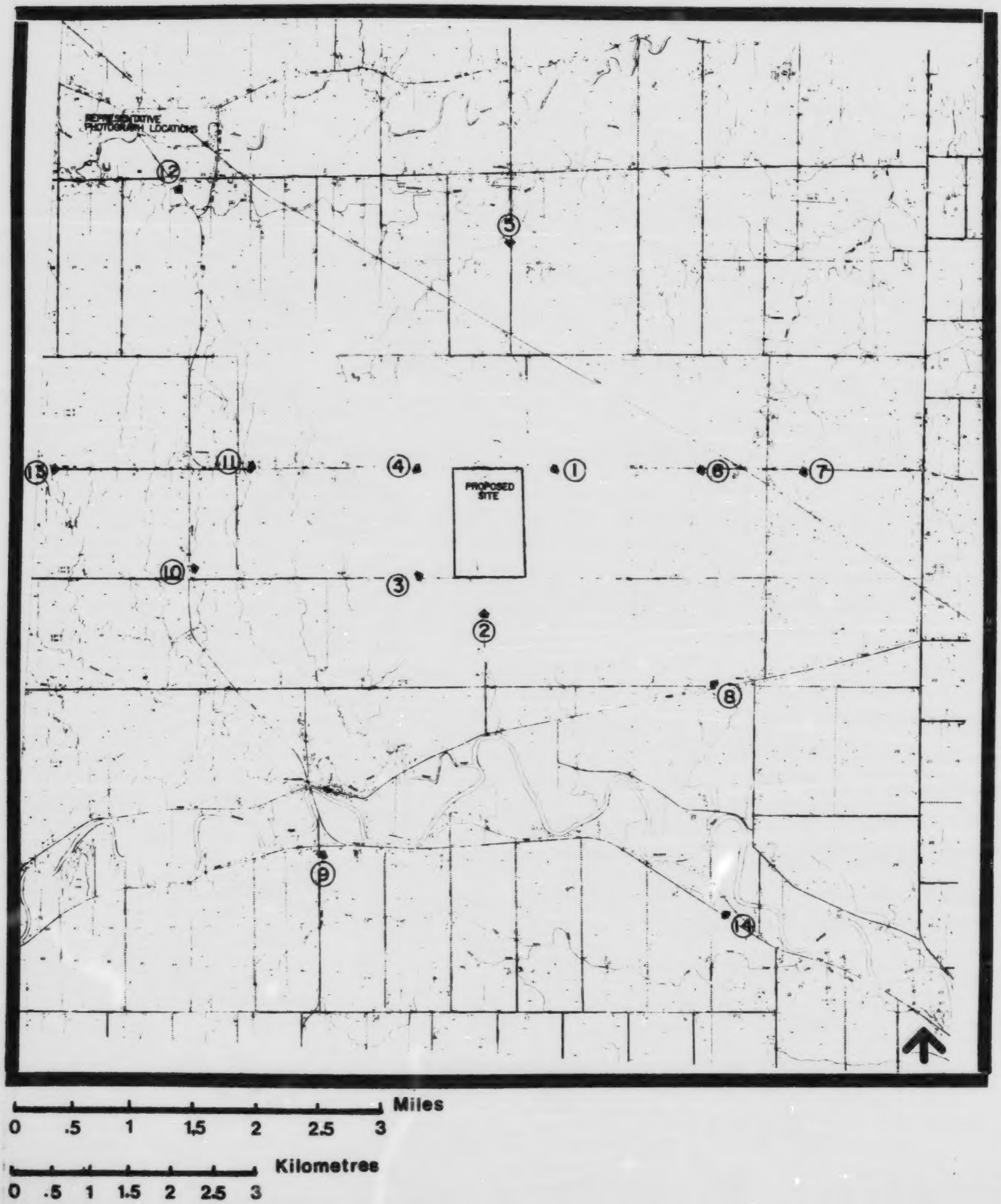
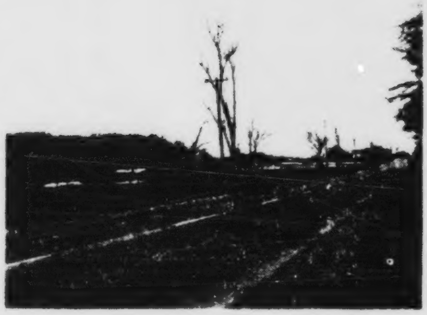
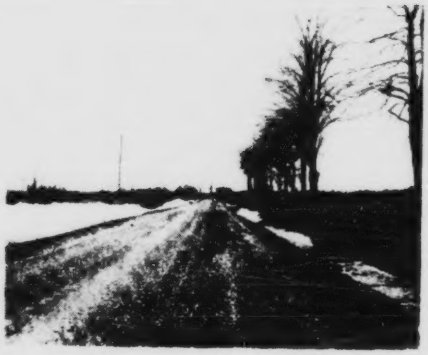

REPRESENTATIVE PHOTOGRAPH LOCATIONS
PROPOSED SITE
1
2
3
4
5
6
7
8
9
10
11
12
13
14
Miles
0 .5 1 1.5 2 2.5 3
Kilometres
0 .5 1 1.5 2 2.5 3

Figure 4 - Representative View Scenes (Winter)

①


②


③

④

⑤

⑥ NOT SHOT

⑦

⑧

Figure 4 - Representative View Scenes (Winter)

⑨

⑩ NOT SHOT

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⑫

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⑭

Figure 5 - Representative View Scenes (Summer)

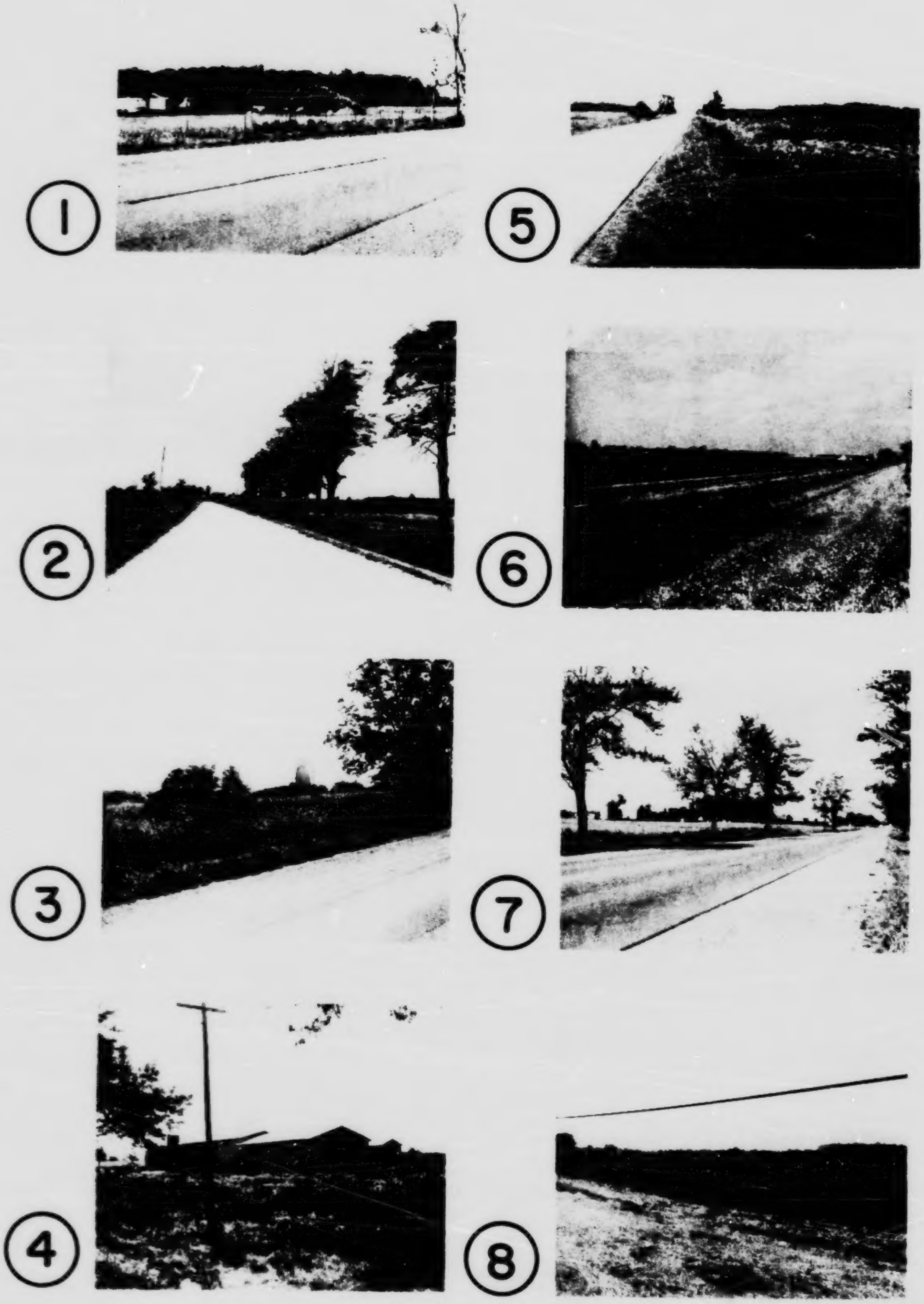

Figure 5 - Representative View Scenes (Summer)

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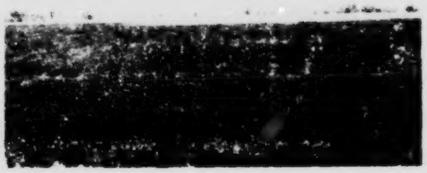


⑭

⑪

⑫

The value for intactness uses the cultural modifications score as a basis. These scores were already a measure, either positive or negative, of the degree of visual integration of the man-made and natural elements in the landscape. These scores were also converted to percentages and then to the 1 - 7 scale.

The value for unity was determined as a measure of the degree of consistency (in the form of a percentage) of the quality of the features in the landscape from scene to scene. These percentage measurements were then averaged to give an overall value and converted to the 1 to 7 scale for comparison with the other values for vividness and intactness.

The overall value for visual quality was determined by combining the percentage values of the three criteria and dividing by three.

$$\text{Overall visual quality} = \frac{(V) + (I) + (U)}{3}$$

where:
V = Vividness value
I = Intactness value
U = Unity value

The percentage values were used instead of the 1 - 7 scale in order to provide a more detailed assessment. The final average percentage was then converted back to a 1 - 7 value for easy identification and comparison.

2.8 Forecasting Procedures

Predicting changes in the visual environment must be based on a clear understanding of possible and/or probable changes to the natural and man-made components. Again the objective is not to say that it will be "better" or "worse", but rather to identify the nature of the possible changes.

The components of the landscape, both natural and man-made, can be broken down into three major features: landform/waterform, vegetation and cultural modifications.

Related aspects of the environment (Ecologistics Ltd., 1987) (Gartner Lee Ltd., 1987) were reviewed to identify possible causes of change in the visual environment. This review focused on changes in agriculture, the natural environment and other related issues.

Examples of changes in the Preferred Site area that could influence the visual environment include the loss or gain of hedgerows or woodlots in relation to open field areas; increase or decrease in the amount of surface water collection in streams or ponds; loss of existing houses or barns; or the building of new houses or barns in the same or new locations.

Changes such as these could result from many agriculturally-related causes. Some of these include:

- changes in the agricultural economy.
- new market trends.
- technological advances in agriculture production.
- other changes felt in rural areas.

Another major cause of changes to the visual features could be the result of other factors including:

- physical changes in rural land use patterns such as more residential lots, commercial strip development, or industrial uses.
- population shifts into or out of the rural setting.
- other social or economic changes.
- natural changes in the rural environment (such as witnessed by the loss of the American Elm from the Ontario countryside).

This range of future scenarios is the basis upon which changes in the visual environment can be identified and interpreted.

2.9 Environmental Framework

The three components of the visual environment, landform/waterform, vegetation and cultural modifications, form the basis of the environmental framework for predictions. Any change in these aspects would result from changes in the physical, natural, economic, social or political environment. The visual analysis identified 3 zones which were used by Institute of Environmental Research Inc. to determine the impact on the sociological aspects of the community and by Ecologistics Ltd. to determine impacts on the agricultural activities. These zones were also integrated by M.M. Dillon to form part of the nuisance impact zones, which included noise and dust impacts.

3.0 DESCRIPTION OF EXISTING AND FUTURE VISUAL ENVIRONMENT

3.1 Introduction

The existing and future visual environment of the region, site proper, site vicinity, and surrounding community are described as to their visual character and visual quality. This description is based on the analysis methods identified in Section 2.0: Study Approach and Methods.

3.2 Regional Setting

The overview of the visual resources carried out in the regional setting has identified two main findings. These are summarized below:

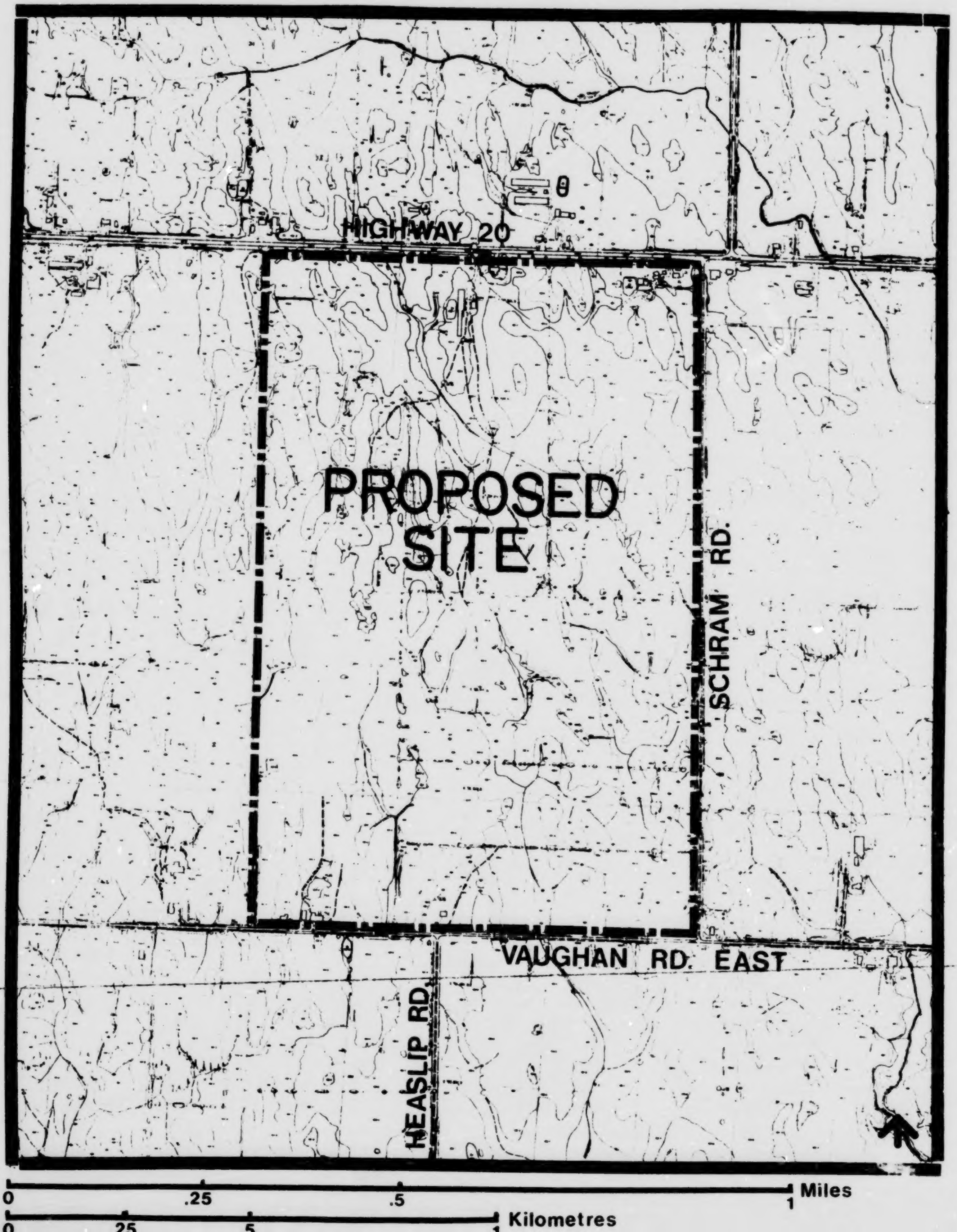
1. The main visual features of the Niagara Peninsula including the Niagara Escarpment, its associated wooded areas, other significant wooded areas, lakeshores, rivers and cultural elements have been considered and assessed. The results indicate that no highly significant visual resources be in the vicinity of the proposed site or community. The Niagara Escarpment is considered outside this visual area.
2. There is little visual distinction between the proposed site vicinity and much of the surrounding regional landscape south of the escarpment.

These findings confirm, that the Preferred Site is located in a very homogeneous regional setting with no significant visual resources nearby. This is also consistent with the Phase 4A study which determined that the site is not visible from any special or designated viewing points. However, these findings also highlighted other concerns expressed in Phase 4A regarding the visual compatibility of a proposed industrial facility in this homogeneous and predominantly flat rural visual environment.

3.3 Site Location And Physical Setting

The site proper is defined as the area within the site acquisition boundary shown on the Phase 4A maps. The site boundary is illustrated on Figure 6. The site area is 124 hectares and occupies Lot 18 and part of Lot 17, Concession 3 in West Lincoln Township, Regional Municipality of Niagara. It is bounded on three sides by roads: Highway 20 on the north, Schram Road on the east and Vaughan Road on the south. The western side of the site is bounded by a small woodlot and open farm fields. Locally, the site is 3.0 km northeast of Wellandport, 6.0 km east of Bismarck, and 2.0 km northwest of the Welland River at its

Figure 6
Preferred Site Boundary
Township of West Lincoln, Regional Municipality of Niagara.


HIGHWAY 20
PROPOSED SITE
SCHRAM RD.
VAUGHAN RD. EAST
HEASLIP RD.
0
.25
.5
1
Miles
0
.25
.5
1
Kilometres

closest point.

The physical setting of the Preferred Site is on a portion of the Haldimand Clay Plain. The terrain is generally flat, however several small, shallow, poorly drained depressions occur on the site, containing standing water year-round. The site is bisected by a small natural swale which flows from north to south and eventually into the Welland River.

3.4 Visual Character

General Description

The preferred site itself is presently composed of several visual features. The primary features include a small forest woodlot containing both upland and lowland deciduous species occupying approximately 6 hectares; a lowland shrub thicket occupies 1 hectare; marshy areas occupy 7 hectares; old fields occupy 4 hectares; disturbed fields occupy approximately 42 hectares; croplands occupy 63 hectares; and other unclassified areas occupy 1.0 hectare. (Gartner Lee Ltd., Biology Phase 4B Report)

The dominant visual component, therefore, is the open field, marsh and cropland area with approximately 93% of the site area. In addition, 3 houses, a barn and outbuilding clusters are present.

The visual openness of the site as determined in Phase 4A is confirmed in this phase of the work. It is highly exposed to views inward from immediate surrounding roads and field areas.

The existing visual character of the Preferred Site vicinity has been assessed and is generally found to have the following characteristics:

- relatively flat landforms
- rural, mixed farming environment characterized by open fields for crops, livestock/pasture lands, with fences, poultry barns, barns, outbuildings, and farm houses.
- existing woodlots consist of maturing stands of mixed hardwoods with thickets/hedgerows, defining fields to some extent.
- Highway 20, a two lane paved highway running in an east/west direction with gravel shoulders, borders the northern boundary of the site for 900 metres.
- Schram Road and Vaughan Road are two-lane gravel roads bordering the eastern and southern boundaries of the site.

- some mature roadside tree planting is present but not continuous along Highway 20.

- some mature roadside planting and hedgerows exist along the other adjacent roads.

- typical building heights and materials are generally as follows:
  - houses 2-2 1/2 story (8.5m-10m high); wood and masonry construction.
  - barns - 12-15 m. in height; wood and steel construction.
  - poultry barns - 9-12 metres high x up to 50 m. length; steel construction.
  - silos - average approximately 25-30 metres high; concrete and steel construction.

Specific Characteristics

The specific elements of this visual character are identified below as to main features form, line, colour and texture. The aspects of each are rated as to their degree of expression (insignificant, significant, dominant or very dominant) as identified on Table 1: Visual Character Summary - Existing Landscape (see also Appendices B and C).

Form and Main Features

- sky is dominant year round due to flatness of landform and extent of open fields.

- cultural modifications are somewhat significant but do not dominant the scenery; at certain locations, large barns and silos become more immediate and dominant.

- vegetation, as expected, is quite dominant in summer and only significant in winter; vegetation masses are generally of consistent scale and offer little diversity with few coniferous materials. Heights ranged from 12 to 18 metres.

- the flat landform decreases in significance in summer due to the increased dominance of the vegetation, particularly crops.

Line

- horizontal lines are significant in winter, but become more pronounced when vegetation is in leaf as field edges become more defined.

- vertical lines are dominant in winter due to the more visible presence of such features as tree structures, buildings and hydro poles, etc.

TABLE 1 - VISUAL CHARACTER SUMMARY - EXISTING LANDSCAPE

	FORM/FEATURES				LINE			COLOUR								TEXTURE	
	SKY	LANDFORM	CULTURAL MODIFICATION	VEGETATION	HORIZONTAL	VERTICAL	OBLIQUE	LIGHT BROWN	MEDIUM BROWN	DARK BROWN	LT./MED. GREEN	DARK GREEN	BLUE	GRAY	OTHER	SIGNIFICANT	INSIGNIFICANT
WINTER VEGETATION (WITHOUT LEAVES)	◪	⧄	⧄	⧄	⧄	◪	◪	⧄	☐	⧄	☐	☐	◪	⧄	☐	◪	■
SUMMER VEGETATION WITH LEAVES)	◪	☐	⧄	◪	◪	⧄	◪	⧄	☐	☐	◪	☐	◪	☐	☐	◪	■
ONSISTENT	✱		✱				✱	✱	✱			✱	✱		✱	✱	✱

✱ INDICATES CONSISTENCY BETWEEN SEASONS

☐ INSIGNIFICANT (0-10% of scene)

⧄ SIGNIFICANT (10-25% of scene)

◪ DOMINANT (25-50% of scene)

■ **VERY DOMINANT** (over 50% of scene)

- oblique lines are consistently dominant year-round in this landscape due to the perspective effect of roads, utility lines, buildings, hedgerows and woodlot edges etc.

Colour

- light browns were significant year-round.
- dark browns were more significant in the winter and less so in the summer due to increase in greens at that time of year.
- light to medium greens were dominant in summer and only significant in winter.
- blues were dominant year-round (however these blues were completely associated with sky colour on the days of photography).
- grays were significant in winter (these were also associated with sky colour to some extent, but also with road surfaces).
- other colours were insignificant year-round; but, when found, offer focuses of interest such as the red barns.

Texture

- significant textures were dominant in the scenery year-round; generally these were found in the foreground areas of the representative scenes.
- insignificant textures were very dominant year-round, generally in the middlegrounds and backgrounds.

Observations

The most consistently dominant form/feature in this landscape is the sky with colour ranging from grays to blues. This dominance is mainly attributable to the flat land forms and lack of visually enclosing elements in the landscape such as extensive vegetation masses, hedgerows, or building groupings. Depending on viewer location, sky will be most dominant in the open areas such as farm fields and open stretches of road; and less dominant around building groupings and vegetation such as near farm buildings and hedgerows or woodlots.

Due to the dominance of sky in this landscape, it will be particularly sensitive to vertical intrusions above the horizon line, tree line or existing building lines.

In addition, the existing cultural modifications are consistent year-round and are of a rural flavour being farm houses, barns, silos, roadways and utility poles of a similar scale. The visual character of this landscape will therefore be sensitive to further development of cultural modifications of a non-rural character or of differing scale. There are, however, several relatively recent, large steel-clad chicken barns and sheds and concrete silos in the area which are of a differing scale to the older, traditional barns. These more recent barns and silos are visually significant, and in the past have represented major visual changes in this landscape. Presumably, they are now visually acceptable to the community because they are agricultural in function.

There is no apparent major dominance of either vertical or horizontal lines in this landscape. They are almost equally represented, but with summer dominance of horizontals and winter dominance of verticals. No particular sensitivity can be found to be associated with this characteristic as long as the changes occur below the existing horizon line, tree line and/or building lines. Verticals extending above any of these lines, however, would be highly exposed.

Colour has been assessed for two seasons and there are some consistencies between these. These occur in the ranges of light to medium browns, dark greens (not significant), blues and others (again, not significant). It should also be recognized that variations of these colours as well as other colours may be present at times of the year for which there is no photographic record. This would include light greens in the spring, yellows and reds in the fall and white in winter. The colour of the sky ranges from dark blues to light blues on sunny days and light grays to dark grays on overcast days. Due to its dominance in this landscape, the sky would be more sensitive to the intrusion of dark or bright colours as opposed to light blues and grays.

Although present to a small extent in this landscape, bright colours are highly noticeable due to their high degree of contrast with the surrounding colour environment.

3.5 Visual Quality

The visual quality of the Preferred Site, site vicinity and surrounding community has been assessed based on the analysis methods outlined in Section 2.0: Approach and Methods. This approach to the assessment of visual quality, through the careful review of the representative scenes has identified specific levels of quality for each of the three determining criteria (vividness, intactness and unity) as well as an overall visual quality rating.

It should be pointed out, again, that any landscape, whether it be natural, rural, urban or any variation of these can be rated. The type of the landscape does not necessarily govern its quality.

Table 3: Landscape Quality Assessment (Winter) and Table 4: Landscape Quality Assessment (Summer) located in Appendix 3 document the individual scores for the representative scenes. These tables serve as the basis for the interpretation that follows.

Vividness

Vividness combines the individual scores of the various aspects of the landscape scenes including landform, vegetation, water, colour, adjacent scenery, scarcity and cultural modifications. These scores combine to provide a measure of the memorability and distinctiveness of the landscape. The scores for these aspects have been totalled, averaged and converted to a scale of 1 to 7 for both winter and summer to yield an overall rating for vividness (see Conversion Table page 11).

These scores are as follows:

Winter score = $\frac{55}{396}$ = 13.8%

Summer score = $\frac{78}{462}$ = 16.8%

Average score = 15.3%

Converted to the 1-7 scale, the overall vividness rating for this landscape is 6, representing LOW VIVIDNESS.

Intactness

Intactness has been measured by assessing the scores for the positive or negative influence of cultural modifications on the natural components of the landscape. Cultural modifications are seen as contributing to (positive), having no appreciable effect or detracting (negative) from visual quality. These aspects provide a measure of the degree of disruptive encroachments in the landscape. Again, the scores for this aspect have been totaled, averaged and converted to a scale of 1-7 for both winter and summer to yield a rating for intactness.

The scores are as follows:

Winter score = $\frac{42}{72}$ = 58.3%

Summer score = $\frac{50}{84}$ = 59.5%

Average score = = 58.9%

Converted to the 1-7 scale, the overall intactness rating is 3, representing MODERATELY HIGH INTACTNESS.

Unity

Unity of the landscape has been measured as the degree of consistent visual harmony from scene to scene. Aspects that vary significantly between scenes represent decreased coherence and harmony in the landscape. The level of consistency of each of the aspects from scene to scene has been identified on a percentage basis for both winter and summer and have been converted to the 1-7 scale for an overall unity score.

The scores are as follows:

Winter = 89.2% consistency from scene to scene.
Summer = 82.6% consistency from scene to scene.

Average = 85.9%

Converted to the 1-7 scale, the overall unity rating is 1, representing VERY HIGH UNITY.

Overall Visual Quality

The overall visual quality combines the average scores for each of the three criteria converted to a 1-7 score.

The scores are as follows:

Vividness = 6
Intactness = 3
Unity = 1

Average = $\frac{10}{3}$ = 3.33

The overall visual quality rating is 3, representing MODERATELY HIGH VISUAL QUALITY.

Observations

The findings of the visual quality assessment of the existing landscape identify a moderately high level of visual quality. It is not a particularly outstanding or memorable example of a rural landscape with vivid images, but it does gain its strength through its intactness and unity. One concern over the findings of this assessment involves the fact that the visual quality has been evaluated based on only two seasons of the year (i.e. winter and summer). If the spring and fall seasons had been included in this assessment, it is expected that the vividness score may have been somewhat higher. This may be true since colours at these times of year are often more vivid and have greater variety. In addition, water may have been more present in springtime. Including these seasons in the assessment may have resulted in higher vividness scores and hence a somewhat higher visual quality score overall. Generally, however, colour is not as important a determinant as form or line.

Intactness of this rural landscape has been rated moderately high. This indicates that there are relatively few encroachments which are visually disruptive. The hydro transmission towers (far from the proposed site), the very large silos and steel barns have been identified as the only detractors. While the barns do detract from the scenery, they are also now considered acceptable in the landscape since they have appeared as part of the normal incremental change in rural landscapes. These types of changes have occurred because of agricultural market trends and economic conditions.

The unity of the landscape around the Preferred Site has been rated as very high. This rating indicates that there are very few major visually incongruous elements in this landscape and it is quite harmonious.

3.6 Historical Perspective

The review of the heritage character of the landscape around the Preferred Site carried out by Historica Research Ltd., has identified several key findings. The purpose of this information was to provide a basis for evaluating how the existing landscape has evolved to date and to predict future changes. The following aspects were seen as present-day remnants of the historical landscape:

1. Property lines - are still visible either as fence lines or hedgerows of vegetation.
   - most existing fences are wire mesh or barbed wire and follow the property lines.
   - some farm consolidation has occurred but early property lines are still visible, often as a row of trees in a field.
2. Trees - most prominent are the large farm woodlots which are generally located at the back of the farm, near the middle of the concession.
   - this feature does occur on the Preferred Site.
   - most farms have windbreak and/or ornamental planting near the houses.
   - trees have been planted along Highway 20 and are seen growing along sideroads.
3. Architecture - no examples of early settlement houses.
   - most existing housing in the site vicinity has been upgraded rather than replaced.
   - new housing has been in small strips developed along Highway 20.
   - barns from the early 20th century as well as large new painted steel barns are present.
   - early 20th century concrete silos are less common than the recent tall concrete and steel silos.
   - the original school exists but is now a house.
4. Farmsteads - in the 1870's the Preferred Site had seven farm units.
   - now only four of the farm units contain buildings and only one has a distinctive working farm image.
5. Roads - all roads were laid out in grid patterns
   - generally, the concession roads are maintained at a 16 foot width, with some narrower.

These observations of past and present development patterns in the study area are useful in providing an historical base for future development in the area. In order to minimize contrasts these patterns should be recognized, preserved and enhanced where possible and appropriate as a basis for mitigation.

3.7 Existing Specific Views

Viewers of the Preferred Site, include two main groups: residents and non-residents. Non-residents are generally considered those dynamic viewers who pass through the site vicinity or community in vehicles.

Some of the farm and non-farm residents within 0.8 km of the site presently can view the open fields, woodlot and hedgerows as well as the dwellings and other buildings. Generally the ability to view specific areas or features on the preferred site is limited to within this 0.8 km foreground zone except to the southeast of the site where longer views are possible.

Beyond this immediate zone, resident viewers would have great difficulty distinguishing the existing features of the site from the general landscape. However, familiarity with the site environs could enhance this comprehension for long-time residents.

There are presently 27 resident household locations within the 0.8 km foreground. As well, in the closely related area from 0.8 km to 1.0 km there are an additional 11 resident household locations.

Table 5: Existing Resident Views of Preferred Site, summarizes the content of the views from existing resident household locations to the site.

Viewers passing the site by road will have a dynamic view made up of long-distance views, mid-range views and close-up views. In the general vicinity, it is unlikely that they will be able to identify existing features on the site until they are well within the 0.8 km foreground zone. Then, the speed at which they are travelling will also govern the scope of views of the driver. Passengers, however, will be free to view the open fields, woodlot, barns, houses, fences and other features of the site. There are no outstanding visual landmarks or other unique features to catch their eyes. Because of this, it is unlikely that passing motorists will have a specific image of this site as distinct from the rest of the rural landscape.

TABLE 2 - EXISTING RESIDENT VIEWS OF PREFERRED SITE

	Resident Household	RF/ RR	Distance to Site (m.)	Content of View
0.8 km	1	RF	30	Fields/Woodlots/Farmyard
	2	RR	30	Fields/Woodlots/Farmyard
	3	RR	60	Fields/Woodlots/Farmyard
	4	RF	160	Fields/Woodlots/Farmyard
	5	RR	200	Fields Farmyards
	6	RF	330	Fields Farmyards
	7	RF	560	Fields Farmyards
	8	RR	670	Distant Trees Farmyards
	9	RR	720	Distant Trees Farmyards
	10	RF	710	Fields,Trees
	11	RF	650	Fields,Trees,Woodlots
	12	RF	310	Fields,Woodlots,Trees/Farmyards
	13	RF	330	Fields, Trees
	14	RR	20	Fields,Woodlots,Trees,Farmyards
	15	RF	550	Fields,Woodlots,Trees,Farmyards
	16	RF	160	Fields,Woodlots,Trees,Farmyards
	17	RR	660	No view of site
	18	RR	620	Hedgerow/Woodlot
	19	RF	600	Hedgerow/Woodlot
	20	RR	520	Hedgerow/Woodlot
	21	RR	450	Hedgerow/Woodlot
	22	RR	420	Hedgerow/Woodlot
	23	RF	350	Fields/Woodlots/Hedgerows/Farmyards
	24	RR	320	Fields/Woodlots/Hedgerows/Farmyard
	25	RR	300	Fields/Woodlots/Hedgerows/Farmyard
	26	RR	150	Fields/Woodlots/Hedgerows/Farmyard
	27	RF	30	Fields/Woodlots/Hedgerows/Farmyard
.8-1.0 km	28	RR	900	No view of site
	29	RF	1000	No view of site
	30	RF	810	Fields/Farmyards
	31	RR	950	No view of site
	32	RR	830	Distant Fields/Trees
	33	RF	880	Distant Fields/Trees
	34	RF	900	Distant Fields/Trees
	35	RF	930	Distant Fields/Trees/Farmyards
	36	RR	880	No view of site
	37	RF	810	No view of site
	38	RR	850	No view of site

RF - Rural Farm
RR - Rural Resident

3.8 Future Visual Conditions (without facility)

Based on our understanding of the historical development of the Preferred Site vicinity, community and region, incremental change has been the pattern. Other than the OWMC facility proposal, we are aware of no other dramatic changes that would influence the visual environment in the foreseeable future.

It is possible and reasonable to expect that some visual changes may occur on a gradual basis in this area. However, these changes are not expected to be major or abrupt.

The vegetation patterns would continue to mature and develop to the climax forest for the region; farm operations are expected to continue and change slowly; roads are expected to remain at their present scale; no other proposals for changes are evident at this time.

4.0 FACILITY CHARACTERISTICS AND IMPACT DETERMINATION METHODS

4.1 Introduction

This part of the report focuses on the changes that may occur in the visual environment due to the development of the OWMC facility on the preferred site.

The facility visual characteristics are now explored, documented, compared with and superimposed on the existing visual condition, to identify the potential range of visual impacts. In addition, a range of appropriate mitigation measures are identified and applied with net impacts defined.

The basis for this study is that visual changes in the environment caused by the facility would be considered a negative impact and that mitigation measures would be required to minimize and/or manage these negative impacts.

The opposite point of view is also possible. That is, that the facility could be visually enhanced by various architectural treatments to such a degree that it would increase its vividness and therefore its memorability for the viewer. This could be a positive feature in the existing landscape which may be presently considered monotonous. For the purpose of this study it is felt that the facility would have a negative visual impact and that mitigation measures should be implemented as much as possible to screen as well as enhance the facility.

4.2 Data Sources

This analysis uses the 150,000 tonne/year facility design as outlined in the Monenco Phase 4B Report Facility Characteristics dated 1987 and through discussions with Monenco staff. In addition, several other engineering reports and environmental reports prepared by OWMC consultants have been referred to in this study.

4.3 Time Horizons

Approximate time horizons are as follows:

Anticipated Year of Operation	Total Waste Quantities
1	50,000
5	150,000
10	300,000

4.4 Assumptions

Facility Construction Period

- construction is planned to start in the spring with civil activities during the summer months, buildings will be enclosed as soon as practical for continued work during the winter.
- no construction camp will be required.
- a major equipment and materials laydown area is required on-site.
- all existing buildings and the woodlot(s) will be removed.
- the construction plan is based on a 5 day week and on an 8 hour day, starting time is 8:00 a.m. and finishing time is 4:30 p.m., with one-half hour lunch at noon.
- off-site construction will commence in the spring and is expected to be completed by the fall of the same year.
- off-site construction may include the raw water pipeline from the pumphouse to the plant, and the raw water inlet and pumphouse at the Welland River.

Operational Phase

The visual aspects of the facility itself are summarized below:

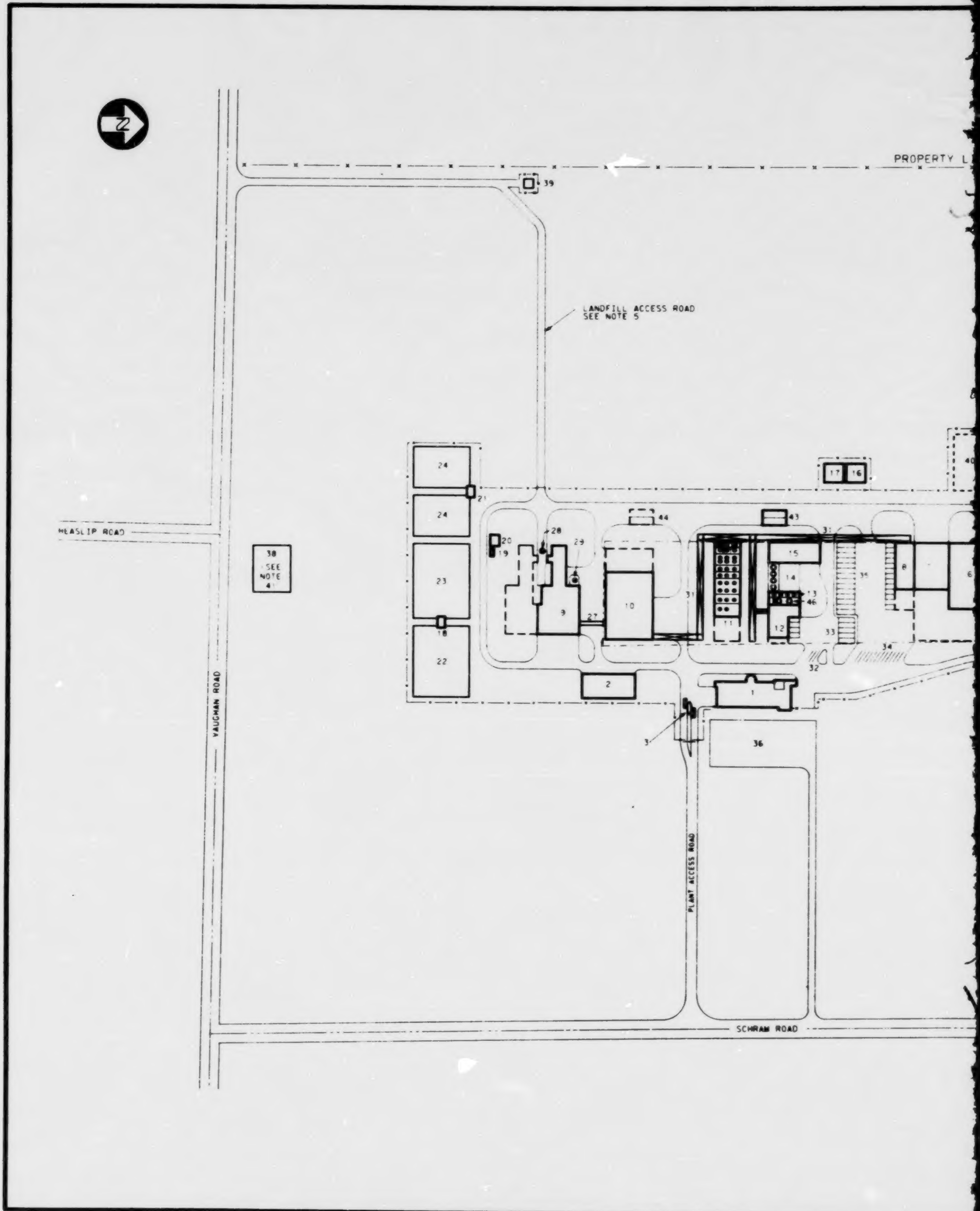
General Appearance

The overall appearance of the facility is identified on the accompanying site plan and aerial perspective. These illustrate the major components, layout and general relationships, information on the heights, shape and scale of the facilities and some information on finishes and texture. Refer to Figures 7 and 8 for the general appearance of the facility as taken from the Monenco Report.

The three major components are the Rotary Kiln Incinerator, Physical/Chemical Treatment Plant and the Engineered Landfill. These components are broken down and described as to their main visual elements as follows:

Site Development and Engineered Landfill

- a fifty metre (50 m.) buffer zone allowance will exist between the perimeter fence and the engineered landfill areas.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PROPERTY L
39
LANDFILL ACCESS ROAD
SEE NOTE 5
HEASLIP ROAD
VAUGHMAN ROAD
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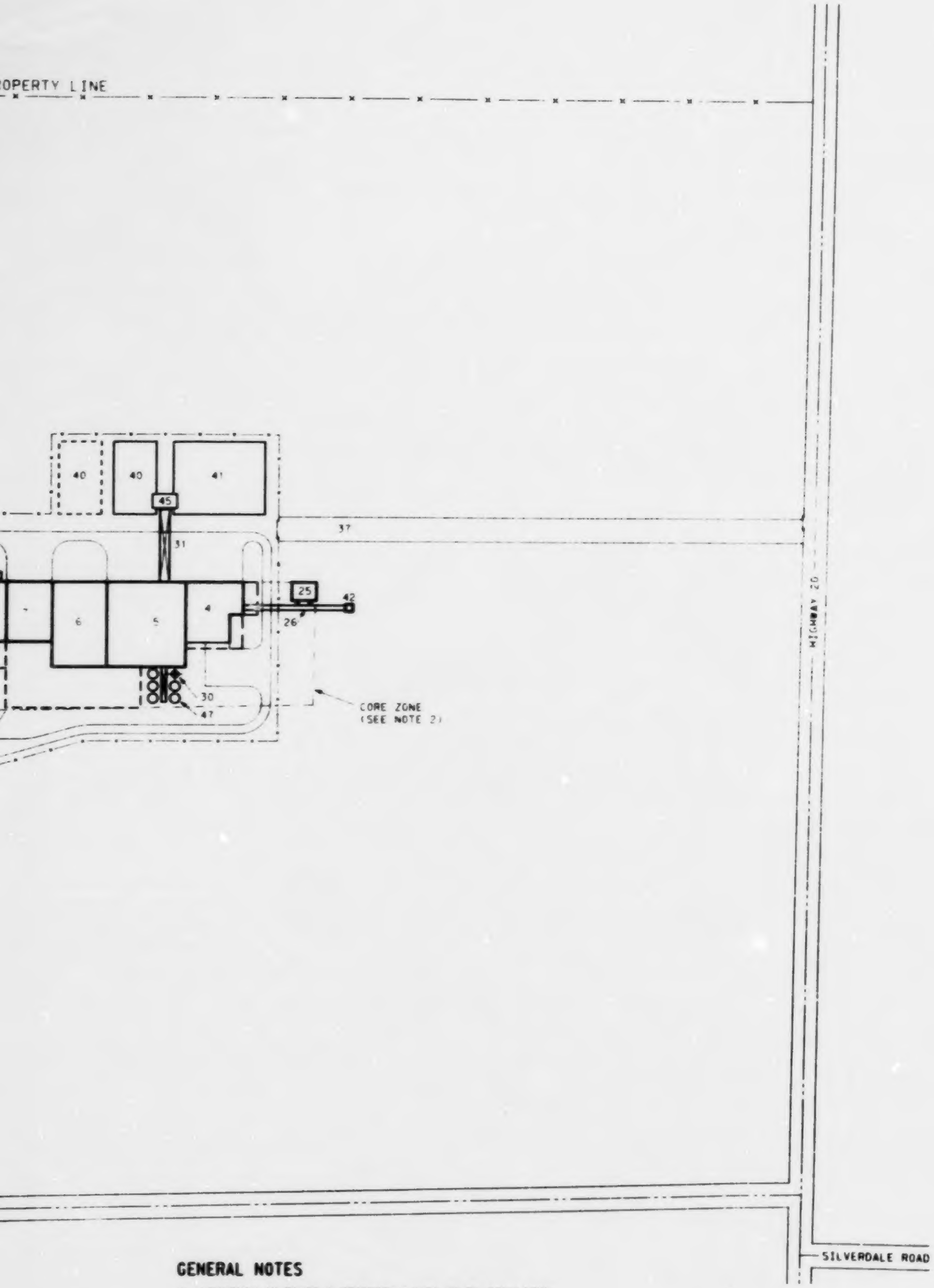
PLANT ACCESS ROAD
SCHRAM ROAD

Figure 7-



LEGEND

1. ADMINISTRATION BUILDING
2. MAINTENANCE BUILDING
3. GATEHOUSE & WEIGH SCALES
4. SOLIDIFICATION PLANT
5. PHYSICAL/CHEMICAL TREATMENT PLANT
6. PHYSICAL/CHEMICAL STORAGE TANK AREA
7. INORGANIC DRUM STORAGE & HANDLING BUILDING
8. INORGANIC TANK TRUCK UNLOADING AREA
9. INCINERATION PLANT
10. ORGANIC DRUM STORAGE & HANDLING BUILDING
11. INCINERATOR TANK FARM
12. ORGANIC TANK TRUCK UNLOADING AREA
13. INCINERATOR WASTE RECEIVING TANKS
14. SEGREGATED ORGANIC STORAGE TANK AREA
15. STORAGE BUILDING
16. MAIN SUBSTATION
17. EMERGENCY POWER STATION
18. SURFACE WATER PUMPHOUSE
19. SANITARY SEWAGE PLANT
20. RAW WATER TREATMENT PLANT
21. FIREWATER PUMPHOUSE
22. SURFACE WATER POND (POTENTIALLY CONTAMINATED
23. SURFACE WATER POND (UNCONTAMINATED)
24. FIREWATER POND
25. SOLIDIFIED MATERIAL INTERIM STORAGE BUILDING
26. SOLIDIFIED MATERIAL CONVEYOR
27. DRUM CONVEYOR
28. INCINERATOR STACK
29. AUXILIARY BOILER STACK
30. EVAPORATOR STACK
31. PIPERACK
32. TEMPORARY TRUCK HOLDING AREA (ORGANIC)
33. TRUCK HOLDING AREA (ORGANIC)
34. TEMPORARY TRUCK HOLDING AREA (INORGANIC)
35. TRUCK HOLDING AREA (INORGANIC)
36. CAR PARK
37. EMERGENCY ROAD, HYDRO & GAS CORRIDOR
38. LANDFILL STORM DETENTION POND
39. METEOROLOGICAL/AIR MONITORING STATION
40. RECYCLE WATER POND
41. EVAPORATOR FEED POND
42. TRUCK LOAD OUT STATION
43. TRUCK WASH STATION
44. TRUCK WASH STATION (FUTURE)
45. EVAPORATOR/RECYCLE PUMP HOUSE
46. FUEL OIL TANKS
47. EFFLUENT STORAGE TANKS

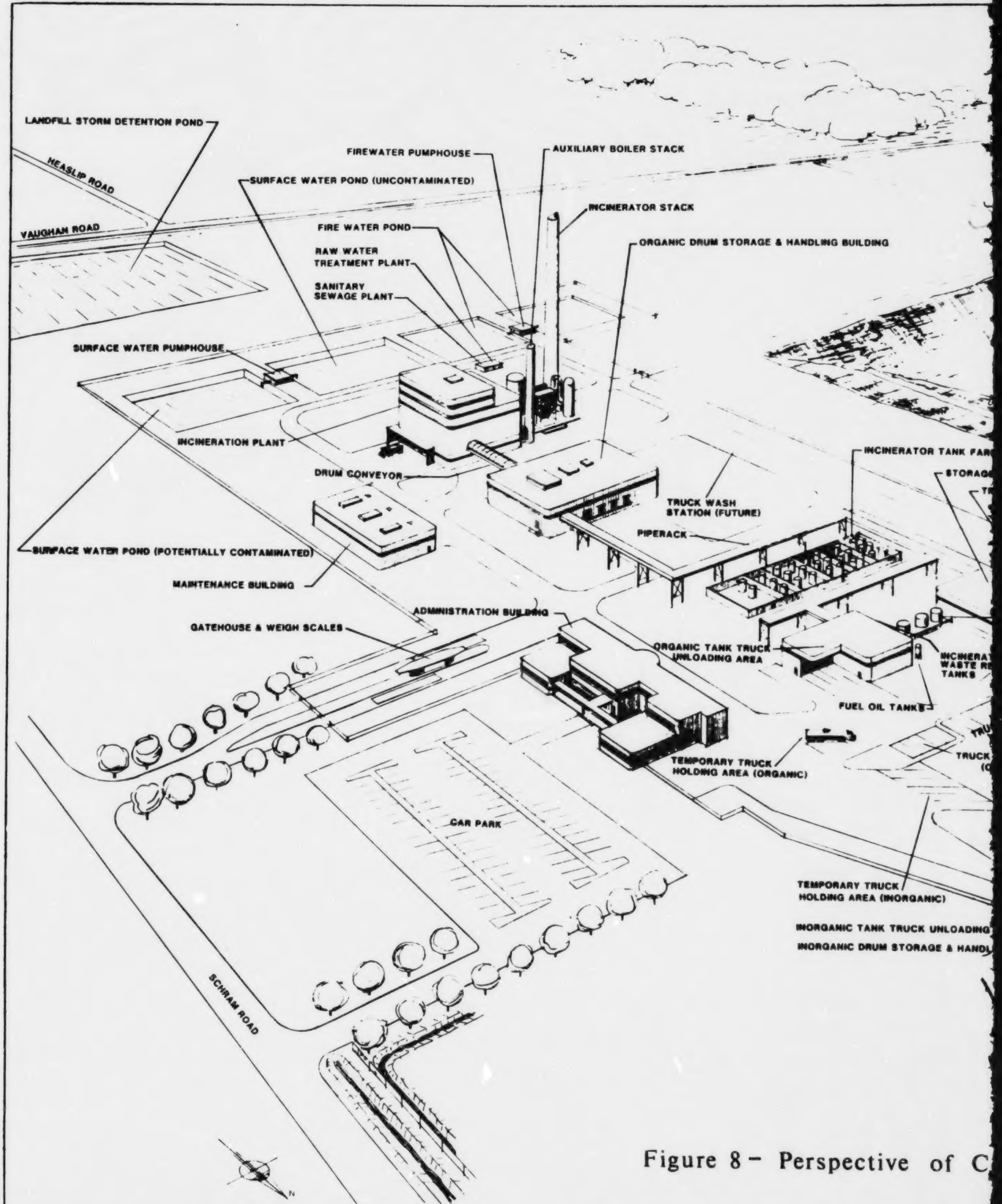
GENERAL NOTES

1. LOCATION OF ROADS & PROPERTY LINES TO BE FINALIZED FOLLOWING CONFIRMATION BY AERIAL AND/OR LEGAL SURVEY
2. CORE ZONE IS DEFINED AS AN ENVELOPE 400M FROM THE SITE BOUNDARIES, AS ESTABLISHED BY OWMC
3. RAIL CORRIDOR NOT SHOWN
4. SIZE & LOCATION OF LANDFILL STORM DETENTION POND TO BE CONFIRMED
5. EXACT LOCATION OF LANDFILL ACCESS ROAD TO BE DETERMINED

July, 1987

Source: Monenco "Phase 4B
Facility Design" 1987

e 7 - Site Plan


LANDFILL STORM DETENTION POND
HEASLIP ROAD
VAUGHAN ROAD
FIREWATER PUMPHOUSE
AUXILIARY BOILER STACK
SURFACE WATER POND (UNCONTAMINATED)
INCINERATOR STACK
FIRE WATER POND
RAW WATER
TREATMENT PLANT
ORGANIC DRUM STORAGE & HANDLING BUILDING
SANITARY
SEWAGE PLANT
SURFACE WATER PUMPHOUSE
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PIPERACK
SURFACE WATER POND (POTENTIALLY CONTAMINATED)
MAINTENANCE BUILDING
ADMINISTRATION BUILDING
GATEHOUSE & WEIGH SCALES
ORGANIC TANK TRUCK
UNLOADING AREA
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TEMPORARY TRUCK
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CAR PARK
TEMPORARY TRUCK
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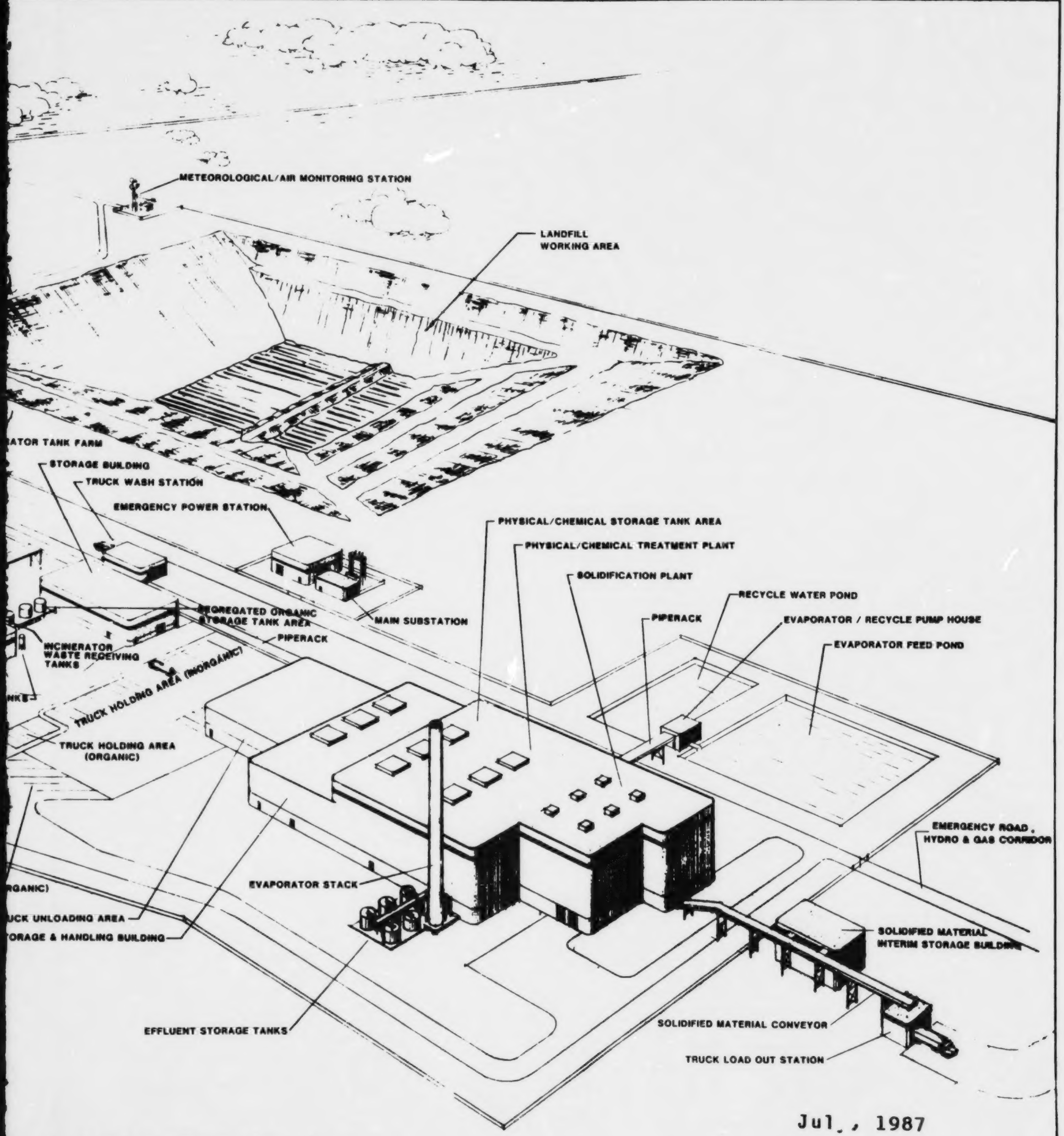
INORGANIC DRUM STORAGE & HANDL
SCHRAM ROAD
N

Figure 8 – Perspective of C


METEOROLOGICAL/AIR MONITORING STATION
LANDFILL WORKING AREA
ATOR TANK FARM
STORAGE BUILDING
TRUCK WASH STATION
EMERGENCY POWER STATION
PHYSICAL/CHEMICAL STORAGE TANK AREA
PHYSICAL/CHEMICAL TREATMENT PLANT
SOLIDIFICATION PLANT
RECYCLE WATER POND
PIPERACK
EVAPORATOR / RECYCLE PUMP HOUSE
EVAPORATOR FEED POND
SEGREGATED ORGANIC STORAGE TANK AREA
MAIN SUBSTATION
PIPERACK
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RGANIC)
EVAPORATOR STACK
UCK UNLOADING AREA
ORAGE & HANDLING BUILDING
SOLIDIFIED MATERIAL INTERIM STORAGE BUILDING
EFFLUENT STORAGE TANKS
SOLIDIFIED MATERIAL CONVEYOR
TRUCK LOAD OUT STATION

Jul., 1987

e of Central Operating Area

Source: Monenco "Phase 4B Facility Design" 1987

- an undulating berm between 1 metre and 5 metres high with 1:3 side slopes is proposed within this buffer zone allowance.

- excavated material from the engineered landfill will become available for berm construction or other landscape development (if suitable).

- areas designated for engineered landfill will not be available for landscape development. It will be graded with shallow swales.

- the engineered landfill operation will use the shallow entombed method with 1:3 side slopes and 15 m. total depth of excavation with ongoing area development.

- the engineered landfill itself will consist of solidified material spread and compacted over the area under development.

- the engineered landfill operations are planned for daylight hours and therefore permanent lighting will not be installed.

- in the event that engineered landfill operations continue through the night, mobile generator sets will be used to supply temporary light at the working area.

- roadways and parking areas within the facility will have lighting designed to direct downward.

- all outdoor operating areas requiring lighting at or near ground level will be lit by low elevation lights directed downwards.

Stacks and Plumes

Various stacks and pipes that discharge to the atmosphere at a specific height will be present at the facility. These are described separately below:

Incinerator Stack

- the incinerator stack will be made of concrete, and may be tapered.

- dimensions are: - 4.5 metres in diameter
  60 metres in height

- the stack for the first incinerator (150,000 tonne phase) will contain one flue and will exude a plume of condensate during certain operating and climatic conditions.

- the plume may be visible at most times during the year, but will be even more visible in cold weather.
- the incinerator stack will require aircraft warning lights.
- the expanded facility (300,000 tonne phase) with a second incinerator will utilize the same stack with a second flue.
- the additional flue will contribute to an increase in the volume of discharge and visible increase to the plume.

Evaporator Stack

- the evaporator discharge is a single stack approximately 0.8 metres in diameter and 45.0 metres in height.
- the stack may be supported from the Physical/Chemical building and free standing above the roof line, and of a similar construction to that of the incinerator stack.
- a visible plume would be formed under almost all conditions, ranging from several hundred metres long under typical conditions, to up to 3 km. or more under extreme conditions (Ontario Research Foundation Phase 4B Report Atmospheric Conditions 1987).
- will require aircraft warning lights.

Auxiliary Boiler Stack

- the auxiliary boiler stack will be approximately 2.5 metres in diameter and approximately 30 metres in height.
- oil or gas may be used as a fuel; in the case of oil, a significant plume of smoke is not expected; in the case of gas, a plume is expected, due to moisture and will therefore be most visible in cold weather.
- may require aircraft warning lights.

Main Buildings and Facilities

- the buildings and other operating elements of the facility are located in the central operating area (approximately 190,000 $m.^2$) centrally located within the site and arranged in a north-south grouping orientation.
- the facility operating area is to be almost completely surrounded by the landfill with the exception of access roads, future rail line and drainage ditches as illustrated in the accompanying site plan from Monenco Ltd.
- a 20 metre buffer area is to be provided around the central operating area.
- all main facilities, buildings and other components are itemized below (TABLE 3) along with their key dimensions:

TABLE 3 DIMENSIONS OF FACILITY COMPONENTS

Ref. No	Facility Components	Length	Width	Height
1.	Administration Building	85	33	7.7H
2.	Maintenance Building	55	25	5.5H
3.	Gatehouse & Weigh Scales			
4.	Solidification Plant	50	47	24
5.	Physical/Chemical Treatment Plant	70	64	24H
6.	Physical/Chemical Storage Tank Area	70	45	12H
7.	Inorganic Drum Storage & Handling Building	54	37	8H
8.	Inorganic Tank Truck Unloading Area	54	20	8H
9.	Incineration Plant	88	46	15H
10.	Organic Drum Storage & Handling Building	77	50	7H
11.	Incineration Tank Farm	77	45	
12.	Organic Tank Truck Unloading Area	26	23	8H
13.	Incinerator Waste Receiving Tanks	34	10	
14.	Segregated Organic Storage Tank Area	34	27	
15.	Storage Building	55	23	8H
16.	Main Substation	20	25	4.25H
17.	Emergency Power Station	20	25	4.25H
18.	Surface Water Pumphouse	12	8	4H
19.	Sanitary Sewage Plant	8	4	4H
20.	Raw Water Treatment Plant	12	10	4H
21.	Firewater Pumphouse	12	8	4
22.	Surface Water Pond (Potentially Contaminated)	75	60	5(Depth)
23.	Surface Water Pond (Uncontaminated)	75	60	5(Depth)
24.	Firewater Pond 2	50	45	5(Depth)
25.	Solidified Material Interim Storage Building	20	15	8H
26.	Solidified Material Conveyor			
27.	Drum Conveyor			
28.	Incinerator Stack	4.5 x 60 H		
29.	Auxiliary Boiler Stack	2.5 x 30 H		
30.	Evaporator Stack	0.8 x 45 H		
31.	Pipe Rack			
32.	Temporary Truck Holding Area (Organic)			
33.	Truck Holding Area (Organic)			
34.	Temporary Truck Holding Area (Inorganic)			
35.	Truck Holding Area (Inorganic)			
36.	Car Park			
37.	Emergency Road, Hydro & Gas Corridor			
38.	Landfill Storm Detention Pond	50	40	5(Depth)
39.	Meteorological/Air Monitoring Station			
40.	Recycle Water Pond	60	35	5(Depth)
41.	Evaporator Feed Pond	77	60	5(Depth)
42.	Truck Load Out Station	6	6	16H
43.	Truck Wash Station	25	15	6H
44.	Truck Wash Station (Future)			
45.	Evaporator/Recycle Pumphouse	12	8	4H
46.	Effluent Storage Tanks	22	22	

ALL DIMENSIONS IN METRES

(Monenco Facility Characteristics Report, 1987)

4.5 Parameters

The range of parameters previously identified also apply to this portion of the report as well as the following:

- Resident household locations and land use data were available within 5 km of the site.
- Visual simulations of the facility superimposed on the landscape are limited to a technical, symbolic level of representation and are not suitable as true-to-life graphic depictions of the proposal (See Appendix H).
- No data examining colour, materials or texture were examined in this report.

4.6 Prediction Procedures

The following techniques have been used to provide predictions concerning the future visual conditions associated with the construction and operations of the OWMC facility on the Preferred Site:

Site Proper

1. A visual character assessment of the proposed facility from its four profile elevations was conducted as to form, line, colour and texture. In addition, an overview of its dominance, scale, diversity, and continuity was also undertaken.
2. Calculation of the areas of new development on the site and their visual conditions was completed. This includes areas of roads/paving, buildings, ponds, buffer berms, and landfill.

Site Vicinity and Community

1. The facility site plan was superimposed on the site vicinity land base at a scale of 1:10,000. This base was used to construct and plot the preliminary overall viewshed and limit of visibility.
2. The detailed facility site plan was superimposed on an updated 1:2000 scale site vicinity land base. This base was used to construct and plot the viewsheds for specific dominant elements of the facility in the immediate site vicinity (0 -1.0 km).

3. Viewer exposures were plotted and recorded for resident household locations, surrounding roads and farmland areas.

4. Plotted sections through the site, facility and surrounding areas to illustrate relationships between proposed facility, roads and resident households.

5. Transfer and plot detailed visual exposure zones from the 1:2000 scale base to the 1:10,000 scale base to define varying degrees of exposure at the site vicinity scale (0 - 5 km ±).

6. Located positions of helium balloons in the representative scene photographs and graphically represent the height of facility elements on an acetate overlay for each photograph.

7. Rated the scenes with the facility elements overlay as to the degree of contrast between the existing visual features and the proposed facility. Ratings were initially made in a comparative, descriptive form, then transposed to a rating system based on distance and visibility of the features of the facility.

8. Mitigation techniques were examined and applied to the proposed facility to identify the nature and extent of possible opportunities.

9. Predictions with mitigation were then reviewed to identify net visual changes.

4.7 Evaluation Procedures

The data produced in the prediction procedures were evaluated for the study areas, with and without mitigation measures. Both quantitative and qualitative aspects were evaluated.

The quantitative aspects for the site proper include the comparison of existing and proposed areas of new development versus the existing open fields, forested areas, hedgerows and cultural modifications that would be lost. The changes in these areas were evaluated as to the extent of physical change to the visual resource features (landform, vegetation and cultural modifications).

Quantitative Evaluation

Evaluation of quantitative data for the site vicinity and community involved the data derived from the viewer exposures. These included the numbers of residents (farm and non farm), amount of roadway, traffic volumes and areas of farmland exposed and to what extent. The figures were then compared with the existing view scenarios for each. Mitigation measures concerning screening of the facility were reviewed and applied to the site to determine the potential effect of screening (ie: reducing numbers of exposed viewers, length of road, areas of fields, etc.)

Qualitative Evaluation

The anticipated changes in the visual character and visual quality were evaluated. The anticipated changes were compared with the existing character and quality levels for vividness, intactness and unity.

The technique of "Contrast Rating" was also utilized to evaluate the degree of contrast between the proposed facility and the existing landscape. The contrast rating was identified based on a three step process which is outlined below:

Step 1: Ratings were identified from the degree of visibility analysis for each representative viewing point. The following table indicate these rating values and their relationships:

TABLE 4 - DEGREE OF VISIBILITY

Facility Features Distance from Facility	Stack + Plume	Two Stacks + Plumes	Stacks, Plumes, Buildings	Stacks, Plumes, Buildings, Berms
Foreground (0-.8 km)	Moderately High	High	Very High	Very High
Middleground (.8-5.0 km)	Moderately Low	Moderate	Moderately High	High
Background (over 5.0 km)	Very Low/None	Low	Moderately Low	Moderate

Step 2: The values from the above chart together with a degree of similarity rating were utilized in Table 7: Degree of Contrast to obtain a score for visual contrast. Degree of similarity refers to the visual consistency between the proposed facility and the existing visual environment.

TABLE 5 - DEGREE OF CONTRAST

Degree of Similarity / Degree of Visibility	Very Similar	Similar	Somewhat Similar	Not Similar
1 Very High 2 High	0	1	2	3
3 Moderately High 4 Moderate	0	0	1	2
5 Moderately Low 6 Low	0	0	0	1
7 Very Low 8 None	0	0	0	0

Step 3: The scores from this assessment were then used to identify overall contrast ratings for each representative scene based on the following chart format:

TABLE 6 - CONTRAST RATING CHART

Features	Elements/ Weights		Degree of Contrast	Score for Each Element
Landform Waterform	Form (4)	X	Strong (3)	
Vegetation	Line (3)		Moderate (2)	
Cultural Modifications	Colour (2)		Weak (1)	
	Texture (1)		None (0)	
				Total

The total contrast score for each feature was then used to define the overall contrast according to the following categories:

HIGH (H) 21-30 Points - Demands attention and will not be overlooked by the average observer.

MODERATE (M) 11-20 Points - Attracts attention and begins to dominate.

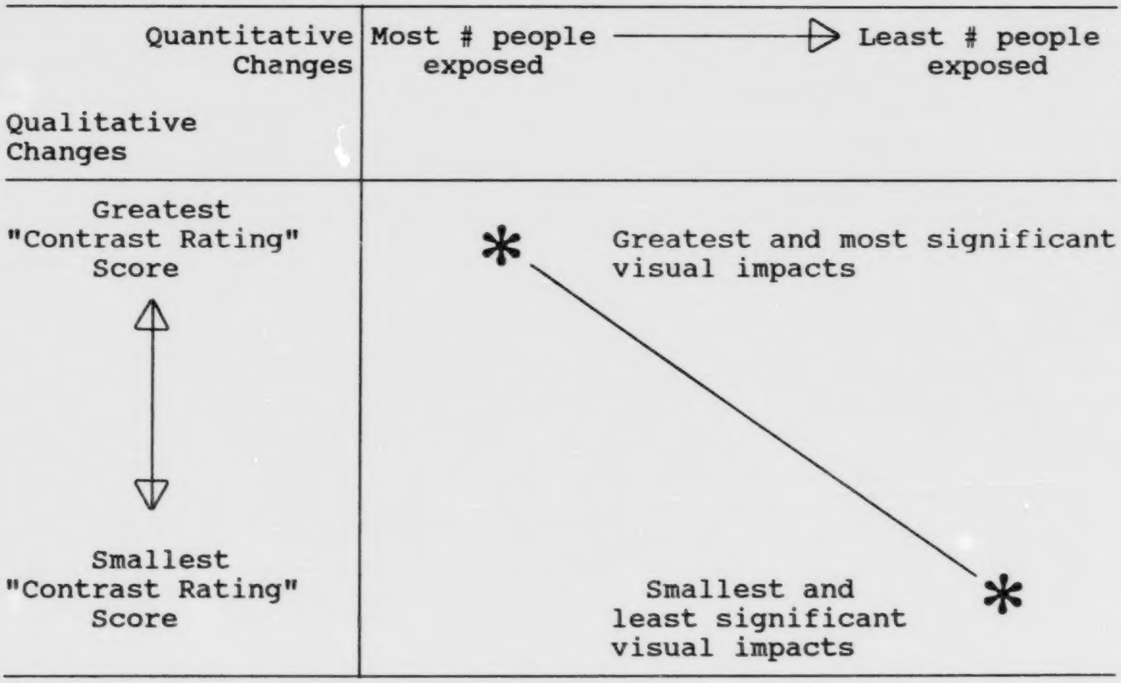
LOW (L) 0-10 Points - Contrast can be seen but does not attract attention.

Mitigation measures which focus on visual quality improvements were also assessed and tested. The most appropriate mitigation measures were identified and the anticipated net visual conditions defined.

Synthesis Procedures

The quantitative and qualitative changes in the visual conditions were inter-related and combined with the historical perspective findings and the viewer sensitivity data to define the scope and nature of the potential visual impacts.

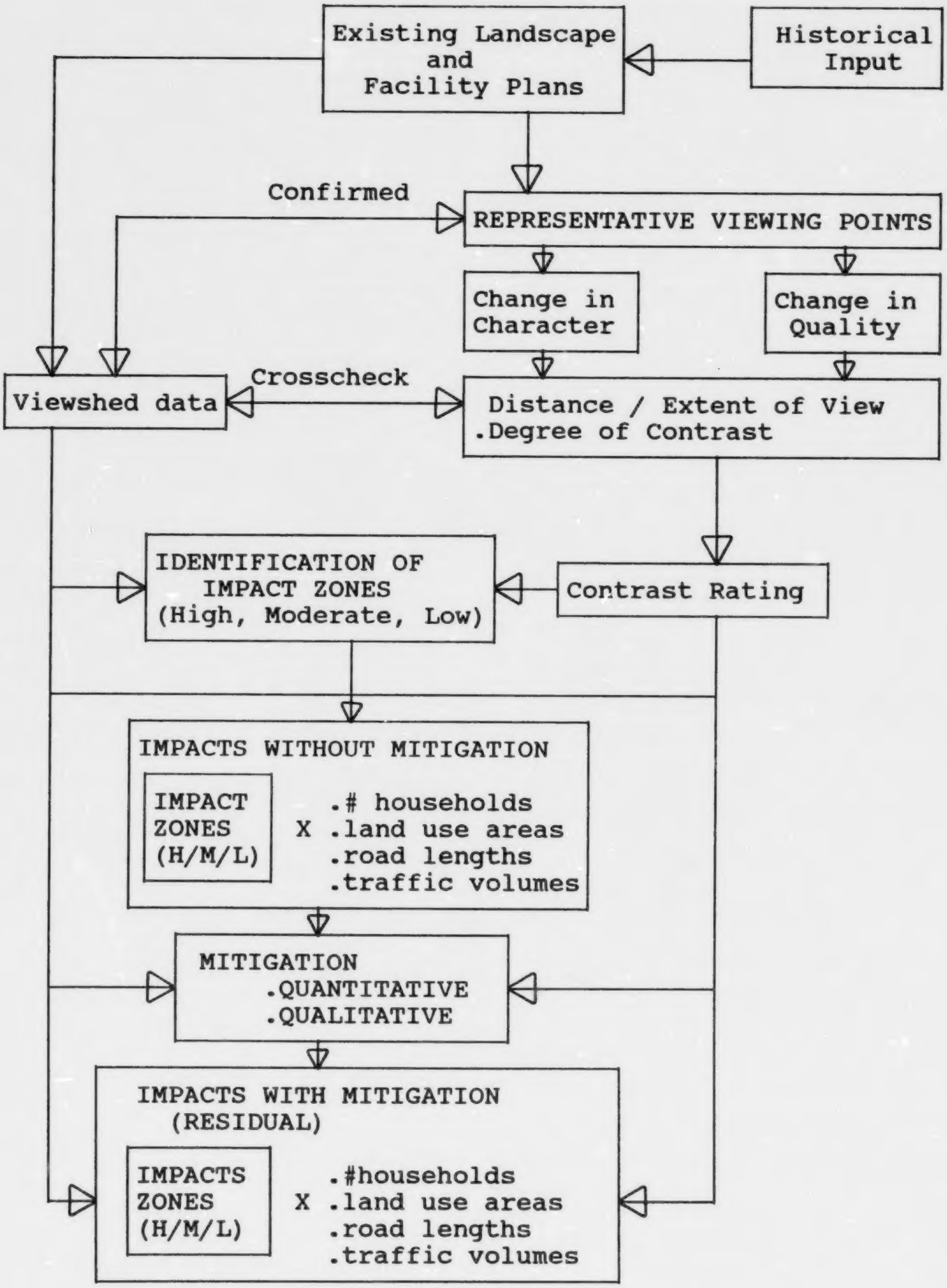
Generally, the qualitative and quantitative aspects were seen to inter-relate in the following manner:


Quantitative Changes
Most # people exposed
Least # people exposed
Qualitative Changes
Greatest "Contrast Rating" Score
Smallest "Contrast Rating" Score
Greatest and most significant visual impacts
Smallest and least significant visual impacts

The effects of mitigation were also related to these findings to assess their potential effects and identify the net visual impacts.

Table 7: Visual Impacts Synthesis Diagram illustrates the flow of data used to identify impacts and the potential effects of mitigation.

TABLE 7 - VISUAL IMPACTS SYNTHESIS DIAGRAM


Existing Landscape and Facility Plans
Historical Input
Confirmed
REPRESENTATIVE VIEWING POINTS
Change in Character
Change in Quality
Viewshed data
Crosscheck
Distance / Extent of View
.Degree of Contrast
IDENTIFICATION OF IMPACT ZONES (High, Moderate, Low)
Contrast Rating
IMPACTS WITHOUT MITIGATION
IMPACT ZONES (H/M/L)
X
.# households
.land use areas
.road lengths
.traffic volumes
MITIGATION
.QUANTITATIVE
.QUALITATIVE
IMPACTS WITH MITIGATION (RESIDUAL)
IMPACTS ZONES (H/M/L)
X
.#households
.land use areas
.road lengths
.traffic volumes

5.0 FACTOR IDENTIFICATION AND RATIONALE

The main factors identified in this study are categorized as follows:

- change in visual character
- change in visual quality
- viewer exposure
- viewer sensitivity

Each of these factors were assigned numerical values which were used to generate an evaluation of the existing and future conditions of the site. These values were used to measure the impact of the facility on the site and the site vicinity.

These factors are defined as follows:

Change in visual character - visual character is determined by four basic pattern elements of form, line, colour and texture. The more visual variety, with harmony, of these elements, the more aesthetically pleasing the landscape. By assigning numerical values to these elements and averaging the results from each representative viewing point an overall "Contrast Rating" is produced for the study site which reflects the anticipated visual impact of the facility at the preferred location. This contrast rating indicates the elements of the character which would change and what specific mitigation techniques could be implemented to effectively reduce the impact of the facility.

Change in visual quality - visual quality is determined by three variables; the vividness, intactness, and unity of a landscape. These variables are measured by assigning numerical values to components of the landscape, mainly; landform, vegetation, waterform, adjacent scenery, scarcity, and cultural modifications. By averaging scores for these variables from each representative viewing point a visual quality score may be objectively determined for the site and site vicinity. By comparing this score with scores from the representative viewing points with the facility superimposed in them, qualitative changes may be identified and appropriate mitigation measures proposed.

Viewer exposure - viewer exposure is defined as the combination of the population affected (resident and non-resident), the duration of view and the extent and nature of the view. By quantifying this information a measure is provided as to the "who", "what", "where", and "when" of those affected by visual changes in the landscape. This data is used to measure the effectiveness of proposed mitigation measures.

Viewer sensitivity - viewer sensitivity is determined by viewer activity and awareness and is ranked according to various variables which consist of: distance from facility, type of activity, user characteristics, duration of exposure, degree of exposure and perceived changes to the visual quality and character of the landscape. These results will determine priorities and locations for proposed mitigation measures.

6.0 PREDICTED CHANGES (WITHOUT MITIGATION)

6.1 Framework

The environmental framework which applies to this aspect of the visual impact assessment includes considerations for the site proper, site vicinity and community. These study areas are assessed for the construction, operational and decommissioning phases.

The main focus of this assessment is on the operational phase. The construction phase is a short term, evolving process having impacts that can be predicted based on the findings of the operational phase assessment. The future expansion of the facility is also addressed in this manner. The final phase of the project is the decommissioning of the facility.

Impact zones were identified through the combination of viewshed data and contrast rating scores as described in the next sections of this report.

6.1.1 Viewshed Identification

The proposed facility plan was superimposed on the detailed existing landscape bases at a scale of 1:2000. These base plans provided the data to graphically construct the detailed viewshed for the facility throughout the surrounding landscape.

The viewsheds for the major visible components of the facility were plotted individually. These included the surrounding areas from where the incinerator stack, the evaporator stack, the tallest buildings and the berm would potentially be visible.

This individual treatment allowed for very specific predictions as to the visibility of the various components as well as the identification of areas where more than one, all or none of the facility could be seen. Where only minor screening elements were present (such as individual trees, buildings or small hedgerows), the receptor was considered to be exposed. The aspect which could not be plotted due to its dynamic nature was the plume from the stacks. The pertinent data from this viewshed analysis was combined with the Contrast Rating data to map the impact zones.

6.1.2 Contrast Ratings

The Contrast Ratings for each of the representative scene views was next identified. Each scene was assessed with an outline of the facility overlayed on the scene as to the visual comparison of the facility character with the existing landscape. Where any questions arose in determining the degree of contrast, this analysis applied the higher level to the scene. Appendix D contains sample work sheets for this assessment.

These descriptive comparisons were then categorized as to the degree of visibility of the facility from each viewing point as well as their degree of similarity with the surrounding landscape. Each scene was then assessed to determine the Contrast Rating of the proposed facility in the landscape. Appendix F contains examples of the Contrast Rating score sheets. Tables 8 and 9 summarize the results of this evaluation.

These findings identify a range of overall scores which are broken down into three impact groupings. The three groupings and their corresponding scores are:

Score	Impact Grouping
21 - 30	Demands attention and will not be overlooked by the average observer.
11 - 20	Attracts attention and begins to dominate.
0 - 11	Contrast can be seen but does not attract attention.

The visual impact zones were defined, combining the specific viewshed data with the above qualitative impact groupings.

TABLE 8 - CONTRAST RATING EVALUATION (SUMMER)

Scene	Contrast Rating by Features				
	Landform Score	Vegetation Score	Cultural Modifications	Aggregate Score	Overall Contrast Rating
1	7	3	8	6	LOW
2	24	9	17	16.6	MODERATE
3	30	30	17	25.6	HIGH
4	30	30	4	21.3	HIGH
5	10	3	0	4.3	LOW
6	20	13	14	15.6	MODERATE
7	NOT VISIBLE			0	LOW
8	10	10	10	10	LOW
9	NOT VISIBLE			0	LOW
10	10	10	0	6.6	LOW
11	10	3	0	4.3	LOW
12	NOT VISIBLE			0	LOW
13	NOT VISIBLE			0	LOW
14	NOT VISIBLE			0	LOW

TABLE 9 - CONTRAST RATING EVALUATION (WINTER)

	Contrast Rating by Feature				
Scene	Landform Score	Vegetation Score	Cult. Mod. Score	Aggregate	Overall Contrast Rating
1	30	24	21	25	HIGH
2	27	20	20	22.3	HIGH
3	30	27	14	23.6	HIGH
4	30	25	0	18.3	MODERATE
5	13	14	0	9	LOW
6		NOT	SHOT	0	———
7		NOT VISIBLE		0	LOW
8	10	5	10	8.3	LOW
9		NOT VISIBLE		0	LOW
10		NOT	SHOT	0	———
11	10	1	0	3.6	LOW
12	10	10	0	6.6	LOW
13		NOT VISIBLE		0	LOW
14		NOT VISIBLE		0	LOW

6.1.3 Impact Zone Identification

Four visual impact zones were identified:

- High Impact - demands attention and will not be overlooked by the average observer.
- Moderate Impact - attracts attention and begins to dominate.
- Low Impact - contrasts can be seen but does not attract attention.
- Little or No Impact - facility not visible or only minimally.

The visual impact zones are plotted on Figure 9. These impact zones were determined with the worst case situation of a 60 m stack.

Generally, the high impact zone is directly adjacent to the site and extends out as far as the .8 km. foreground distance. In some areas, however, this high impact zone extends farther than .8 km. due to the open character of the landscape. We have designated this area (ie. beyond .8 km.) as a somewhat lower level of high impact due to distance. Viewers in these areas would have an open, unscreened view of the facility, but from a greater distance.

The moderate impact zone is generally located farther away from the site, from .8 km. out to 2.0 km. In certain areas the moderate impact zone is closer to the site than .8 km. where parts of the facility are screened by dense vegetation allowing only a small portion of the facility to be seen. This moderate zone represents the inner portion of the middleground (.8 - 5.0 km.) referred to earlier in this report. The impact zones represent a further breakdown of the middleground area.

The 2.0 km. distance from the site was established as the outer boundary of the moderate zone based on the evaluations done from the representatives views. It was found that for the proposed facility in this landscape, contrast ratings beyond 2.0 km. were consistently lower (ie. in the "visible but does not dominate" category). This was due to the combination of increased distance and small portion of the facility or plume visibility.

The low impact zone generally fell beyond the 2.0 km. distance out to 5.0 km. from the site. This low impact zone, in some areas, fell within the 2.0 km. distance due to the greater extent of screening present. The 5.0 km. zone boundary was established based on two factors; the 5.0 km. middleground/background boundary established in Phase 4A as well as the results of the Contrast Rating evaluation.

Beyond the 5.0 km. distance from the site, it was determined that the contrasts were very low or virtually non-existent. The only components of the facility potentially visible at this distance were the 60 metre stack and/or the plumes from either of the stacks depending on conditions. The Contrast Ratings from these distances and beyond were extremely low (below 5) and therefore would constitute very low or no visual impact.

6.2 Predictions

6.2.1 Construction Phase

Visual impacts for the construction phase can be identified based on the findings of the operational phase assessment.

As identified in that assessment, the high impact zone (0-0.8km from the site) is the area most exposed to the facility, from the closest distance. It is clear that this area will also be most exposed to the visual disturbance caused by the construction.

As well, the moderate impact zone (0.8 to 2km) is the area less exposed to the facility usually with a certain amount of visual screening. This area may be exposed to the construction phase, but only the aspects involving the taller elements (ie. stacks, cranes and tallest buildings). The ground level construction activity would not generally be exposed to this moderate impact area.

The same would be true of the low impact area. Views from this area are not expected during the construction activity, and perhaps only to the 60m stack when being constructed.

The construction impacts identified in the high impact zone are clearly the most significant. Views to the site from within this area would be exposed to all the site activity, dust, and storage. This area would also be the most exposed to the traffic generated by this phase.

The same number of viewers and area of exposure are expected in the high impact area during construction as during the operational phase. The severity of the impacts in this phase due to dynamic change, construction activity and viewer sensitivity is expected to be greater than the operational phase. However, the construction phase is proposed to be roughly 18 months in duration and therefore these visual disruptions would be limited to this time period.

6.2.2 Operational Phase

Site Proper

The visual character of the facility was assessed as to its dominant form, line, colour and texture. The data provided by Monenco was sufficient to define the form and line aspects, however the colour and texture data were limited. Assumptions were made in this regard based on knowledge of the materials involved.

The following data were assembled from the facility elevations as seen from each of the surrounding roads:

Form	Schram Road	Vaughan Road	Highway 20
Vertically Dominant	8.94%	13.43%	6.49%
Horizontally Dominant	90.93%	86.57%	93.51%
Square	.13%	0	0
Line			
Vertical	21.0%	3.8%	21.5%
Horizontal	79.0%	96.2%	78.5%
Oblique	0	0	0

Colour or texture of the facility was not known for certain at this time. However, it is known that the stacks would be grey concrete and buildings may be masonry or metal clad.

The findings of this analysis point out that there is greater emphasis on horizontal forms and line in the proposed facility than vertical. The vertical elements, while smaller in surface area and length, however, do represent significant new features which intrude on this site, extending well above the existing horizon and tree lines.

The presence of the berm, although horizonal, has an unnatural, uniform shape which is foreign to this relatively flat site. The location of this berm around the perimeter of the site will prevent view penetration of the open fields and other features currently possible here.

The actual physical changes that are expected to take place are summarized below:

New Physical Features Gained

Element	Surface Area	Comments
Roads/Paving	6.57 hectares	-asphalt, dark grey pavement -not seen outside site area
Buildings	2.92 hectares	-upper portions of higher buildings, stacks and plumes can be seen above berm from outside site

Ponds	2.43 hectares	-not visible outside site area
Landfill	114.07 hectares	-not visible outside site area -dust from operations may be visible
Berm	9.03 hectares	-visible from outside site area

Existing Physical Features Lost

Upland and Lowland Deciduous Woodlot	6.0 hectares	-maturing trees and understory can now be seen from site vicinity.
Lowland Shrub Thicket	1.0 hectares	-not visible from site vicinity.
Marshy Areas	7.0 hectares	-not visible from site vicinity.
Old and Recently Disturbed Fields	46.0 hectares	-visible from site vicinity.
Croplands	63.0 hectares	-visible from site vicinity.
Buildings		-visible from site vicinity.
Unclassified Areas	1.0 hectares	-visible from site vicinity.

The visually dominant open areas of the site (ie. croplands, marshs, old and recently disturbed fields) as well as the woodlots and farm buildings would all be lost from view. They would be replaced by a visual barrier at the perimeter of the site which would not permit views into or across the site at ground level.

These changes in the physical features of the site, though not all totally visible from the surrounding areas, will definitely influence the visual character of the site vicinity and community due to changes in building form and line, as well as pattern character of scale, diversity, continuity and dominance.

Site Vicinity and Community

The impact zones in the site vicinity and surrounding community were identified, described and mapped in Section 6.1.3.

The analysis for these areas is first of all carried out on a quantitative basis, followed by a qualitative assessment.

Quantitative Changes

The numbers of people and areas of countryside exposed to views of the proposed facility were tabulated (see Tables 10, 11, 12, 13).

These were then compared with the numbers who are presently exposed to such views.

The other interpretation of these exposure numbers involves the comparison with the total number of potential viewers in the vicinity (0-5.0 km) and those not exposed to the facility.

TABLE 10 - POTENTIAL VISUAL IMPACTS - HOUSEHOLDS

	Exposed Households 0-2 km	Percent Households Exposed	Exposed Households 2.0-5.0 km (Approx.)	Percent Households Exposed
High Impact Zone	25	26%	0	0
Moderate Impact Zone	28	29%	0	0
Low Impact Zone	19	20%	122	53%
No Exposure	24	25%	222	47%
Total	96	100.0%	344	100.0%

TABLE 11 - POTENTIAL VISUAL IMPACTS - LAND AREAS

	Agricultural Areas Within 5 km	Agricultural Percent	Other * Land Uses Within 2 km	Other Land Uses %	Total Vicinity Area
High Impact Zone	481.60 ha	4.9%	3.24 ha	7.1%	484.84 ha
Moderate Impact Zone	604.0 ha	6.2%	20.4 ha	44.8%	624.4 ha
Low Impact Zone	2531.65 ha	25.9%	9.6 ha	21.1%	2541.3 ha
No Exposure	6155.0 ha	63.0%	12.28 ha	27.0%	6167.1 ha
Total	9772.25 ha	100.0%	45.52 ha	100.0%	9817.64 ha

TABLE 12 - POTENTIAL VISUAL IMPACTS - ROADS

	Length of Road Exposed (within 5 km)		Percent of Roads Exposed Within 5 km of site	
	Major	Secondary	Major	Secondary
High Impact Zone	2,100 m	7,300 m	16.5	6.5
Moderate Impact Zone	1,400 m	7,000 m	11.0	6.3
Low Impact Zone	4,150 m	38,690 m	32.7	34.7
No Exposure	5,050 m	58,650 m	39.8	52.5
Total	12,700 m	111,640 m	100.0	100.0

TABLE 13 - POTENTIAL SPECIFIC EXPOSURES OF HIGH IMPACT HOUSEHOLDS

0-.8km #	RF/RR	CAPABLE OF SEEING
1	RF	60m S./45m S./24m BL./BERM
2	RR	60m S./45 S./24m BL./BERM
3	RR	60m S./45 S./24 BL./BERM
4	RF	NOTHING VISIBLE (POSSIBLY BERM)
5	RR	BERM
6	RF	POSSIBLY 60m STACK
7	RF	POSSIBLY 60m STACK
8	RR	NOTHING VISIBLE
9	RR	60m STACK POSSIBLY BERM
10	RF	60m STACK/45m STACK/BERM
11	RF	60m S./POSS. 45m S./POSS. 24m BL./BERM
12	RF	60m S./POSS. 45m S./POSS. 24m BL./ BERM
13	RF	60m S. POSS.
14	RR	60m S./BERM/POSS. 45m S. POSS. 24m BL.
15	RF	60m S./BERM/15m BL./45m S./24m S.
16	RF	POS. 60m S./24m BL./45m S.
17	RR	NOTHING
18	RR	60m S./45m S. POSS.
19	RF	60m S.
20	RR	60m S./24m S./ POSS. 45m S.
21	RR	60m S. POSS.
22	RR	60m S. POSS./24m BL.
23	RF	60m S. POSS./24m BL./45m S. POSS.
24	RR	60m S./45m S./24m BL. POSS.
25	RR	60m S./45m S./24m BL. POSS.
26	RR	60m S./POSS. 45m S. & 24m BL.
27	RF	EVERYTHING
.8-1.0 km		
28	RR	NOTHING
29	RF	NOTHING
30	RF	60m S. POSS./POSS. 24m BL., 45m S.
31	RR	POSS. 60m S., 45m S., 24m BL.
32	RR	60m S./ POSS. 45m S.
33	RF	60m S./ 45m S.
34	RF	60m S./ 45m S./ 24m BL.
35	RF	60m S./ 45m S./ POSS. 24m BL.
36	RR	60m S./ 45m S. POSS./ 24m BL. POSS.
37	RF	60m S./ 45m S. POSS./ 24m BL. POSS.
38	RR	NOTHING

S. - STACK
POSS. - POSSIBLY
BL. - BUILDING

These comparisons illustrate the extent of exposure, by impact zone, to the total possible exposure levels for this site vicinity.

The number of viewers and areas exposed represent the quantitative factors of the visual impact. The significance of these figures is that although it does not appear that a high percentage of the area is in the high and/or moderate impact zones according to land area and road figures, there are a high percentage of residents exposed in these zones. This implies that within the 5.0 km area the preferred site is located near a greater concentration of residents than may be found at other locations within the 5 km area.

Key findings in this section are summarized below:

Resident Households

- Of the 96 households within approximately 2.0 km of the Preferred Site, 72 households or approximately 75% would be potentially exposed to the proposed facility.
- Of the 72 potentially exposed households, 25 households, or approximately 34.7%, would be in the high impact zone; 28 households, or approximately 38.9% would be in the moderate impact zone and; 19 households, or approximately 26.4% would be in the low impact zone.

Land Areas

- Of the 9,818 hectares within 5.0 km of the Preferred Site, 3,650.49 hectares or approximately 37% would be potentially exposed to the proposed facility.
- Of the 3,650.49 hectares potentially exposed to the facility, 484.84 hectares or approximately 13.3% would be in the high impact zone; 624.4 hectares or 17.1% would be in the moderate impact zone; and 2,541.3 hectares or 69.6% would be in the low impact zone.

Roads

- Of the 12,700 linear meters of Highway 20 within 5 km of the Preferred Site, 7,650 m or 60.2% would be potentially exposed to the proposed facility.
- Of the 7,650 meters potentially exposed, 2,100 m or approximately 27.5% would be in the high impact zone; 1,400 m or approximately 18.3% would be in the moderate impact zone; 4,150 m or approximately 54.2% would be in the low impact zone.

It should be pointed out that traffic volumes were available for only the major roads and site access roads. Highway 20 traffic volumes are currently identified as 3,420 vehicles per day. It is anticipated the volume will be 3,610 by 1995 and 3,720 by the year 2000 (Site Assessment Phase 4B: Transportation, 1987). These figures are intended to give an indication of the numbers of dynamic viewers within view of the facility and site. The same traffic volumes apply anywhere along Highway 20 since it passes through high, moderate and low impact zones. The length of road is different in each impact zone and indicates that the greatest area of potential exposure lie in the low/no impact zone.

Qualitative Changes

The qualitative changes to the visual environment are broken down into visual character and visual quality changes.

The visual character changes resulted from changes in the three visual features of the environment (ie. landform, vegetation and cultural modifications). These changes are summarized below based on study assumptions:

Visual Feature	Nature of Change
Landform	- perimeter berm, 5.0 m in height with 1:3 slopes along three sides of the site. - Implications: - loss of views to the open rural landscape - creation of a "visual island" in the flat rural landscape - solid visual element along roads - an undulating shape to the berm (horizontally and vertically) could contribute positively to visual variety for the highway user.
Vegetation	- loss of an existing woodlot due to landfill sequencing - loss of hedgerows defining properties and fenced fields - Implications: - lack of continuity in visual pattern of vegetation - would be seen as a distinct gap in the vegetation patterns of the landscape
Cultural Modifications	- loss of existing rural dwellings and farms (2 houses and 3 barns) - replacement by industrial facility having tall stacks, plumes, buildings and berms.

- Implications: - loss of the characteristic development pattern of the rural landscape
  - would be seen as an imposed modification rather than a natural progression of rural development

The visual quality changes also result from changes in these features, but are evaluative rather than descriptive. The influences have been noted for vividness, intactness and unity (see conversion table on page 11 for figures) as follows:

Vividness:
- existing vividness is LOW (score level six).
- potential increase due to distinctiveness and memorability of the scenery with the facility present
- potential increase to MODERATELY LOW (score level 5).

Intactness:
- existing intactness is MODERATELY HIGH (score level 3)
- potential decrease due to a major disruption or encroachment of non-rural imagery
- potential decrease to LOW (score level six).

Unity:
- existing unity is VERY HIGH (score level one).
- potential decrease due to scale and lack of harmony with surrounding rural landscape
- potential decrease to MODERATE (score level four).

The overall visual quality rating would change based on the following:

$$\text{Potential Visual Quality} = \frac{5 + 6 + 4}{3} = 5.0$$

The visual quality would therefore drop to a MODERATELY LOW level. It should be pointed out that the greatest drop in visual quality will occur in the high impact zone and decrease as the viewer moves to the moderate and low impact zones. This is simply because the facility makes up a smaller portion of the scene as one moves away from the facility.

PLUME VISIBILITY

This section deals with the possible visual impacts which may be present due to the plumes emitted from the proposed facility stacks.

Incinerator Stack

The incinerator stack is a 60m high structure located at the south end of the facility. It is the tallest element in the facility and may be visible for up to and possibly more than 5 km from the site.

It is understood that under normal operating conditions only a minor plume or no visible plume will be emitted from this stack.

Evaporator Stack

The evaporator stack is a 45 m high structure located at the north end of the facility associated with the physical/chemical treatment plan. This stack is the second tallest feature of the facility. The Site Assessment Phase 4B: Atmospheric Conditions Report, prepared by the Ontario Research Foundation, pages 90 - 92 identify that there likely will be a visible plume of water droplets caused by the condensation of the steam emitted through the stack. The Ontario Research Foundation report identified a range of probabilities for exceeding defined visible plume lengths during the four seasons. This data was considered in the identification of potential visual impacts associated with the plume.

Under the normal operating mode, the plume length of 100 - 200 meters will probably be visible most often during the cooler temperature conditions of the winter, spring and fall. It is anticipated that while visible, the plume will draw the viewer's attention toward the stack and facility to a much greater extent than when it is not visible.

The actual area and extent of visibility cannot be accurately plotted due to the dynamic, ever-changing length and direction of the plume. However, even at its shortest length of 100 - 200 m, the plume may be most visible to the Highway 20 travellers and those residences along Highway 20 within 2 km of the site. The plume will also be visible in those areas already exposed to views of the 45 m stack as well as other areas out to, and perhaps further than 5 km from the site.

It is expected that some mitigation of these effects may be possible by operating the evaporator in optimum conditions or at night, thereby minimizing visibility.

Site Lighting

This section deals with the possible visual impacts associated with site lighting. As it is proposed there are two possible effects that may occur; direct views of on-site lighting from off-site locations and indirect lighting visible as a glow from off-site locations. The direct views of site lighting should be minimized by directing the fixtures downward and inward to the facility. Where possible lighting of walls and built features should be avoided. Instead lighting should be directed on to the ground surfaces and building entrances and exits. Views of the direct lighting would be best minimized by on-site mitigation methods combined with rigorous downward directing of fixture cut-off angles. The second possible effect is a lighting glow from the facililty. This is more difficult to mitigate as it would be the cumulative effect of all the lights and is dependent on surface treatments and atmospheric conditions. The less reflective the surface treatments of the facility components, the less glow would be produced. The glow would also be more visible in the winter when there is snow on the ground and no leaves on the trees. When snow cover is present it may be possible to reduce light intensity to compensate for the increased reflection.

For the purpose of this report it is felt that the lighting impact will reasonably correspond to the visual impact zones.

6.2.3 Long Term Future

Visual impacts can also be predicted to some extent for the long term future based upon findings of the operational phase.

Without mitigation, no great moderation of the visual impacts can be foreseen. Perhaps the maturing of existing woodlots and reduction of viewer sensitivity may moderate these impacts to some extent.

The actual areas of exposure, degree of visibility and contrast ratings are not expected to change. (either worsen or improve.)

6.2.4 Viewer Sensitivity

It is anticipated that viewers of the proposed facility will not be equally sensitive to the view. Several factors that affect viewer sensitivity have been identified and include the following:

1. Viewer Activity

   Depending on the viewer's activity, they can be more or less receptive to aspects of the visual environment. For the purposes of this study, we have identified that residents would be more sensitive to change in the visual environment than transients. This assumption was based on the duration of the exposure, focus of attention and activity of the viewer. In addition, this aspect of activity allows us to distinguish between viewers located in residential, recreational, industrial and agricultural areas.

These activity areas have been rated as to viewer sensitivity as follows:

			High Impact Zone	Moderate Impact Zone	Low Impact Zone
Most Sensitive	1.	Residential	most significant		
	2.	Recreational			
	3.	Agricultural			
Least Sensitive	4.	Industrial			least significant

The residents exposed to views of the facility in the high impact zone would therefore bear the greatest and most significant visual impacts. The next level of significance would be associated with the residents in the moderate impact zone, and so on, with the other land uses.

2. Viewer Awareness

The awareness of the viewer to the visual environment is enhanced by visual change. For example, a landscape transition, such as the entrance to a major city, may heighten the awareness as the viewer approaches the city. This heightening of awareness can also be applied to dynamic and physical changes in an existing landscape such as the construction of the proposed facility on the Preferred Site.

It may be found that viewer awareness could be highest during the construction period of the facility and even during the initial operations period. However, over time, this sensitivity may be expected to diminish, since the viewers would be more conditioned to the change.

In order to control viewer awareness, selective screening and extension of the rural landscape character into the site and off-site could be utilized.

3. Local Values and Goals

The local viewer's expectations are indirectly shaped by the local values and goals. Any visible change may be seen as a threat to these values or resources. In the case of the proposed facility on the Preferred Site, it can only be assumed that a visual change of this type would be a major threat to local values toward their visual resource.

7.0 PREDICTED CHANGES (WITH MITIGATION)

7.1 Framework

The approach to mitigation taken in this study was based on dealing with the qualitative and quantitative factors during construction, operations and decommissioning for the various impact zones.

7.1.1 Design Philosophy

The overriding philosophy of the visual mitigation should be to provide a compatible setting for the facility which will enhance its visual quality. This setting should strive to minimize contrasts and visually integrate the facility.

7.1.2 Technical Approaches

On-site and off-site mitigation may be undertaken to control qualitative changes in the visual environment as well as screening of the facility.

On-site techniques could include a range of treatments for the stacks, buildings, site planning, site grading, berms and landscape planting.

Off-site techniques could include both private and public land treatments. Several of these generic techniques are illustrated in Appendix G, "Off-site Mitigation Techniques."

7.2 Mitigation Objectives

Qualitative Mitigation Objectives

The general goal of the qualitative mitigation techniques would be to reduce the degree of contrast of the proposed facility with the existing landscape. The specific objectives associated with this goal are:

1. Recognize and integrate with the historical development pattern of the rural landscape to the extent possible.

2. Recognize and integrate with the existing visual character of the rural landscape with respect to form, line, colour and texture.

3. Recognize and enhance the visual quality of the existing landscape by improving vividness, and controlling losses of intactness and unity.

4. Recognize and respond to the viewer sensitivities to the extent possible.

Quantitative Mitigation Objectives

The overall goal of the quantitative mitigation techniques would be to reduce the visual exposure levels of the surrounding area to the facility. In doing so, these techniques should also be consistent with the guidelines identified for the qualitative mitigation measures. It is also recognized that due to its scale, complete screening of the facility is not realistic. The specific objectives associated with this goal are:

1. Recognize and enhance the screening capability of the existing landscape features including woodlots, hedgerows, landforms, etc.

2. Provide additional visual screening of surrounding areas where residential, agricultural and other land uses are exposed.

3. Provide additional visual screening of the site from users of major highways.

4. Provide additional visual screening of the site from users of secondary roads.

7.3 Mitigation Measures

Specific mitigation measures which should be undertaken to satisfy the above objectives include the following:

On-Site Measures

1. Identify the specific areas of existing vegetation which should be preserved based on the density, quality and potential for survival of the vegetation in order to provide permanent screening. In addition, existing vegetation should also be used as temporary screening during construction where long-term planning calls for their removal.

2. Provide additional naturally-themed planting areas on the site which are in scale with the existing natural rural landscape of the site vicinity. New plantings should consist of dominantly deciduous as well as coniferous vegetation planted in dense groupings to extend existing edges or to create a natural woodlot formation. The planting of these hedgerows, thickets, and tree masses on the periphery should take place after the site preparation and grading work is completed.

3. Shape the proposed buffer berms to be more undulating, with a gentle outer slope. These slopes should be at least 1:5 rather than 1:3, with rounded crests and smoothly blended bases. Where no other forms of screening exist a peripheral berm should be maintained where exposures to the surrounding lands, residences and roads are located in high impact areas.

4. Planting design should be undertaken in close conjuction with the landform design of the berm to maximize their integrated screening capability. Use informal groupings of indigenous trees and shrubs in such a way as to simulate the existing vegetation areas and thereby provide habitat and a food supply for wildlife.

5. The landscape treatments should avoid intensive maintenance that creates a manicured appearance. Rather, natural groupings of plant materials and ground covers designed for low maintenance should prevail to remain consistent with the rural character.

6. Avoid straight-in entrance and exit roads that allow wide open visual penetration into the facility and the landfill areas. Entrance roads should utilize an off-set alignment with plant materials and mounding to effectively screen visual penetration to the facility and maintain visual harmony with the surrounding area.

7. The colour selection could follow one of two approaches. The first approach would be for all structures to achieve the best blending with the surrounding landscape during the four seasons. In case of smooth reflective surfaces, dark colours should be used to minimize contrast. A range of potential colours based on the existing scenery colour pallette should be pre-selected and field tested on large panels to document their compatibility with the visual environment.

   The second approach would be to use bright colours and create a sculptural look to the facility. The emphasis would be to dramatize the components with colours and de-emphasize the industrial qualities of the facility.

8. Lighting should be kept inconspicuous wherever possible and toward the ground. Avoid uplighting of buildings or stacks. Light fixtures should be attached under roof overhangs or on building sides and directed downward. All free-standing fixtures should be low profile and not exceed 4 metres (12 feet) in height.

   Outdoor areas requiring lighting should be visually screened from the surrounding countryside to minimize light glare and penetration beyond the site boundary.

9. Signage for the facility should be developed as a themed family of signs incorporating the basic requirements of identification, direction and safety.

10. The feasibility of locating the fire pond outside the perimeter berm should be explored. As well, the shape should be modified to visually integrate it as a more natural looking body of water. In this way, a required facility has the potential of becoming a visual amenity as well.

11. Site security fencing (ie. chain link) should be integrated with tree, shrub and thicket planting and be as inconspicuous as possible. It is recommended that an unobtrusive matte-black finish be used.

    The use of rural fence types (eg. wire fence and wood posts) on the outer periphery should be used in addition to the security fencing.

Off-Site Measures

1. Attempt to enter into agreement with surrounding land owners and the local planning authority to foster the preservation of significant off-site screening elements. These would include woodlots, substantial hedgerows and thickets.

2. Plant additional large size canopy trees along the existing major and secondary roads in the site vicinity to re-instate some of the lost heritage landscape and thus blend the site treatments with the surroundings.

   This proposed mitigation would apply to segments of roads directly adjacent to the site. In addition, carrying this theme further along these and other roads out to approximately 1-2 km from the site would contain and direct the viewer's attention along the roads, past the site, rather than having uncontrolled views into the site.

3. Carry out new planting of dense deciduous woodlots and/or hedgerows on adjacent properties to provide additional screening in the surrounding landscape.

4. Above ground hydro line should be located and aligned so as not to direct attention to the facility.

5. Carry out individual screening treatments for the most exposed residences (ie. High, Moderate Impact). These treatments may include the planting of dense, coniferous hedgerows, construction of landscape berms and planting and/or privacy fence construction. The most appropriate treatment for each of these households would be assessed on an individual basis.

7.4 Predictions

The mitigation measures outlined above are formulated to reduce the contrast of the proposed facility as well as the numbers of people and areas exposed to it. Modifications to the impacts identified in the previous section are discussed below.

7.4.1 Operational Phase

Site Proper

1. The verticality of the stack elements would be reduced by decreasing the contrast with the background sky. While neutral light colours and simplicity of form would aid in this reduction, the plume, angle of view and relationship to the sun also influence this visual contrast. These aspects cannot be totally overcome.

   The modified form of the berm and gentler side slopes also reduce the degree of contrast with the surrounding flatter landform. The presence of the berm is regarded as an essential component of the mitigation.

2. The areas of physical change on the site itself although mitigatible to a certain extent, would not be totally neutralized by mitigation.

Site Vicinity and Community

1. The reduction of areas of exposure in the surrounding site vicinity is dependant on the extent of visual screening of the facility.

   The analysis in the section without mitigation has included screening provided by the remaining significant vegetation as well as the 5.0 m high berm. In order to reduce the exposed areas further, additional dense planting is required.

   The rate of growth and low visual density of new deciduous planting weakens its' immediate effectiveness for screening. Initially, visual screening with dense vegetative planting will not be very effective, but will gain in effectiveness after approximately five years (assuming large plant materials are used).

   The specific exposure of the foreground households, roads and agricultural areas previously identified will not change greatly in the short term. Over time, however, as these screens mature and become denser, they will become effective in reducing exposures.

2. Qualitative mitigation of the visual features of the facility would create reductions in the contrast rating scores. This would be achieved through the moderation of the severity of the features of the facility as well as by continuing landscape theming into the surrounding countryside. These moderations in the contrast ratings would reduce the severity of the contrasts though would not eliminate them.

Qualitative Changes

The qualitative changes to the visual environment are broken down into visual character and visual quality changes.

The visual features of the landscape are again reviewed, with mitigation:

Visual Feature	Nature of Change

Landform	- perimeter berm, up to 5.0 m in height with 1:3 outer slopes along three sides of the site boundary.
	- Implications:
	  - loss of views to an open rural landscape
	  - less obtrusive "visual island" in the flat landscape
	  - more gradual element along road sides

Vegetation	- loss of existing woodlot (6 ha.)
	- perimeter hedgerows are replanted and roadside plantings are introduced
	- Implications:
	  - less dramatic lack of continuity in visual pattern of vegetation
	  - vegetation patterns around site are augmented

Cultural Modifications	- loss of existing rural dwellings and forms
	- replacements with industrial facility features
	- Implications:
	  - loss of characteristic development pattern of the rural landscape
	  - would still be seen as an imposed modification rather than a natural progression of rural development

The visual quality changes with mitigation also result from changes in those features. These changes are re-assessed as follows:

Vividness:
- existing vividness is Low (score level 6).
- without mitigation, potential increased to Moderately Low (score level 5).
- with mitigation, this indicator may be improved somewhat to Moderate (score level 4).

Intactness:
- existing intactness is Moderately High (score level 3).
- without mitigation, potential decrease to Low (score level 6).
- with mitigation, this indicator may decrease only to Moderately Low (score level 5).

Unity:
- existing unity is Very High (score level 1).
- without mitigation, potential decrease to Moderate (score level 4).
- with mitigation, this indicator may decrease to only Moderately High (score level 3).

The overall visual quality rating with mitigation would change based on the following:

$$\text{Potential Visual Change} = \frac{4 + 5 + 3}{3} = 4.0$$

The change in visual quality could be minimized through mitigation and held to a Moderate Level.

Quantitative Changes

The potential reductions in numbers of viewers and areas of exposure are now compared with the pre-mitigation numbers (see Tables 14, 15 and 16).

TABLE 14 - POTENTIAL IMPACTS WITH MITIGATION - HOUSEHOLDS

	WITH MITIGATION		WITHOUT MITIGATION
	Resident Households	Percent Exposed	Percent Exposed
High Impact Zones	6	6.3%	26%
Moderate Impact Zones	23	24.0%	30%
Low Impact Zones	42	43.7%	20%
No Impact Zones	25	26.0%	24%
TOTAL	96	100	100

TABLE 15 - POTENTIAL IMPACTS WITH MITIGATION - LAND AREAS

	WITH MITIGATION		WITHOUT MITIGATION
	Agricultural Areas (H)	Percent Exposed	Percent Exposed
High Impact Zones	192.20	2.0	4.9
Moderate Impact Zones	566.7	5.8	6.2
Low Impact Zones	2903.1	29.5	25.9
No Impact Zones	6155.6	62.7	63.0
TOTAL	9817.6	100	100

TABLE 16 - POTENTIAL IMPACTS WITH MITIGATION - ROADS

WITH MITIGATION					WITHOUT MITIGATION	
Impact Zones	Length of Road Exposed		Percent Exposed		Percent Exposed	
	Major	Secondary	Major	Secondary	Major	Secondary
High	400m	2900m	3.1%	2.6%	16.5	6.5
Moderate	1700m	6600m	13.4%	5.9%	11.0	6.3
Low	5550m	43490m	43.7%	39.0%	32.7	34.7
No	5050m	58650m	39.8%	53.4%	39.8	52.5
TOTAL	12,700m	111,640	100	100	100	100

Reductions in the exposure levels in the site vicinity have been noted, particularly with respect to the high impact area. Much of the high impact zone, because of the additional screening, has been reduced to the moderate impact zone. This reduction in the high impact zone is responsible for the apparent increase in the moderate impact zone in respect to roads. In addition, significant reductions may be possible in the number of residences exposed, as well as the area of agricultural lands and passing traffic in the high impact zone.

The effectiveness of mitigation measures is contingent upon:

- the cumulative effect of on-site and off-site measures.
- the time required for plant material to mature.
- the distinct area of maximum screening for households.

While improvements can be made toward reducing the number of households, land areas and roads exposed to the facility, it is not realistic to expect that the facility can be totally hidden.

However, through enhancements to the visual setting, the visual acceptability of the facility can be brought to a higher level. Examples of such projects built in the Southern Ontario rural setting include Ontario Hydro Generating Stations and the Stelco Lake Erie Project. Both of these have achieved significant improvements of visual integration through extensive on-site and off-site mitigation.

8.0 IDENTIFICATION AND INTERPRETATION OF RESIDUAL IMPACTS

8.1 Standards And Guidelines

No specific national or provincial visual standards or guidelines can be cited which relate to the construction of the proposed facility.

Official plans and zoning by-laws, by definition, are aimed at the regulation of land-use. In particular, though not mentioned directly, visual compatibility with surrounding land uses is an important ingredient in their formulation.

It has been noted in this study, as well as the Phase 4A report, that there is no visual compatibility of the proposed facility with the Preferred Site and vicinity. This finding, when related to existing, surrounding land uses, makes the incompatibility of the facility obvious from a land use / visual point of view.

The visual impacts, identified in this study, have major influences on the visual integrity of this rural landscape.

The magnitude of negative influences emphasize the need for further design development to manage these visual changes and moderate their effects. The mitigation of these changes should be carried out to the greatest extent possible while remaining sympathetic and responsive to the existing visual character of the area.

8.2 Site Acceptability

The results of this assessment confirm the general findings of the Phase 4A study. This report confirms that the nature and extent of the potential visual impacts of the OWMC facility on the Preferred Site. The main factors contributing to this conclusion are the relatively open, exposed nature of the landscape and the almost purely rural character. For these reasons, the proposed facility would be potentially exposed within a rural landscape.

The exposure of the facility can, through mitigation, be modified to some extent. However, the surrounding visual environment can only be modified to a lesser extent to make the facility somewhat less obtrusive from a visual standpoint.

8.3 Regional And Provincial Context

The visual exposure of the site vicinity to the proposed facility emphasizes the requirement for a thorough and sensitive treatment of the site edges, adjacent properties and roadways to reduce the impact on the immediate vicinity as much as possible.

9.0 MONITORING RECOMMENDATIONS

This study would form the basis, or a starting point, for an ongoing monitoring process of the visual changes that take place over the construction period, operating life of the proposed facility.

The main component of this monitoring program would be the systematic updating of the photographic records from the representative viewing points. During the construction period these photographs should be taken on a seasonal basis from exactly the same viewing points. Once operations commence, these photographs should be repeated on a seasonal basis for the first two years and then on a summer/winter basis thereafter.

The photographic records should be filed systematically and assessed for visual character and visual quality. The results of these assessments should then be compared with the predictions contained in this report.

As well, the actual viewshed of the facility, including plume, at typical seasonal intervals should be identified and again, compared with these predictions.

This process would constitute a visual environmental record of the actual conditions.

In addition, the effectiveness of the proposed mitigation would also be subject to this environmental evaluation and record.

It is also recommended that the general public be encouraged to participate in this evaluation and record. An organized program is suggested in order that the public input generated is meaningful and useful.

Results of the comparison of the actual and predicted findings would be used as a basis for decision-making regarding modifications to the mitigation measures, if required.

This report, together with the monitoring data would provide a thorough case study which then would incorporate visual impact assessment predictions as well as visual monitoring of the actual visual changes. These findings would provide the environmental audit for this project as well as serve as a point of reference for other similar studies.

10.0 SENSITIVITY ANALYSIS

10.1 300,000 Tonne Facility

This study has assumed a facility size of 150,000 tonnes per year. OWMC has suggested that the facility may be expanded to 300,000 tonnes per year. Should this occur a number of additional buildings would be required on the site. Although the building mass would increase, the configuration of the additional structures is very close in size and scale to those of the smaller facility.

It is also understood that should a second rotary kiln be introduced, a second flue will be opened within the already existing stack.

These observations indicate that no radically different structures will be introduced and would not increase the visual impact substantially.

11.0 VISUAL OVERVIEW OF DECOMMISSIONING OF FACILITY

The decommissioning of the facility involves two stages with implications of a visual nature. The first stage is the actual activity involved with the dismantling of the facility components. This could involve heavy truck traffic, cranes on site and demolition activities. These activities should be carefully monitored and co-ordinated to ensure a minimum amount of visual disruption in the site vicinity.

The second stage of decommissioning will involve the resurfacing of the central operating area with clean fill, shaping of shallow swales and revegetation. The perimeter fence will remain and a small storage building on-site will be maintained.

The outer berm and screening vegetation should be maintained since it will be well established at the time of decommissioning. By that time it will also be considered an integral part of the existing landscape and should be left intact.

The visual impacts caused by the stacks, buildings and operational activities will be non-existent subsequent to decommissioning.

GLOSSARY OF TERMS

GLOSSARY OF TERMS

1. Background:	The distant part of a landscape including everything visible beyond 5.0 km from an observer.
2. Cultural Modifications:	Any man-made change in land, waterform or vegetation (roads, bridges, fences, buildings); the addition of a structure which creates a visual contrast to the natural character of a landscape.
3. Foreground:	The detailed landscape found within 0 to 0.8 km from the observer.
4. Intactness:	A measure of the degree of natural condition of the landscape, derived from "development"--the degree of landscape modification by man, and "encroachment"--the degree of visual disruption.
5. Middleground:	The landscape visible from a distance of 0.8 to 5 km from the observer.
6. Mitigation:	A measure taken to reduce the negative visual impact of an object(s) in the environment.
7. Site Proper:	Consists of the actual site area recommended to accommodate the proposed facility and bounded on 3 sides by Highway 20, Schram Road and Vaughan Road respectively.
8. Site Vicinity:	Consists of an area around the site proper to a distance of 5.0 km from the site boundaries.
9. Unity:	A measure of compositional harmony, derived from the congruence of man-made forms with nature and the overall unity of the elements of the view.
10. Viewshed:	Is the surface area visible in all directions from a given point or a series of points; it is also the area from which that viewpoint or series of viewpoints may be seen.

11.	Visual Character:	Is the pattern of a viewed landscape as determined by the four basic visual elements of form, line, colour, texture. The stronger the influence exerted by these elements, the more interesting the landscape.
12.	Visual Quality:	Is the degree of uniqueness and memorability of a landscape as measured by the variety of a number of possible elements. These consist of: landform, vegetation, water, colour, adjacent scenery, scarcity and cultural modifications. The greater the variety with harmony of these elements, the greater the memorability, and the higher the quality of the landscape.
13.	Vividness:	A measure of the distinctiveness, diversity, and contrast of the visual impressions derived from the qualitative assessments of landform, waterform, vegetation and man-made form and their prominence within each segment.

APPENDICES

APPENDIX A

REFERENCE LIST

APPENDIX A
REFERENCE LIST

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APPENDIX B

LANDSCAPE CHARACTER ASSESSMENT WORKSHEETS

SUMMER

SCENE #	LANDSCAPE CHARACTER FORM				LINE			COLOUR								TEXTURE	
	SKY	LANDFORM	CULT. MOD.	VEGETATION	HORIZONTAL	VERTICAL	OBLIQUE	LT. BROWN	MED. BROWN	DARK BROWN	LT/MED GREEN	DARK GREEN	BLUE	GRAY	OTHER	SIGNIFICANT	INSIGNIFICANT
1.	33	7	44	16	15	25	60	20		1	19	6	32	21	1	23	77
2.	41		20	30	22	36	42	20		7	27	5	41			10	90
3.	34		19	47	21	18	61	19			43	4	34			39	61
4.	8		25	67	25	67	8	19		6	58	2	8	1	6	62	38
5	44		12	44	39	11	50	6			36	5	44	8	1	31	69
6	44		48	8	33		67	27			2	6	44	20	1	4	96
7	27	2	32	39	29	21	50	15			32	4	27	19	3	43	57
8	49			51	32		68	30				21	49			40	60
9	47			53	100						45	8	47			95	5
10	53		1	46	100				1		13	33	53			27	73
11	40		5	55	15	45	40	4		5	38	4	40	6	3	40	60
12	54	6	15	25	26	8	66	15	6		11	7	54	7		10	90
13	42		24	34	34	11	55	1			31	4	42	20	2	9	91
14	32		3	65	24	35	41	9		2	48	6	32	1	2	58	42
TOTALS	548	15	248	589	515	277	608	185	7	21	403	115	547	103	19	491	909
AVG.	39	1	18	42	37	20	43	13	1	2	29	8	39	7	1	35	65

FIGURES IN PERCENTAGES.

SPRING/FALL

LANDSCAPE CHARACTER

SCENE #	FORM				LINE			COLOUR								TEXTURE	
	SKY	LANDFORM	CULT. MOD.	VEGETATION	HORIZONTAL	VERTICAL	OBLIQUE	LT. BROWN	MED. BROWN	DARK BROWN	LT/MED GREEN	DARK GREEN	BLUE	GRAY	OTHER	SIGNIFICANT	INSIGNIFICANT
1.	47	10	33	10	4	38	58	10	2	7			47	33	1	14	86
2.	44	6	32	18	25	56	19	8	2	18			44	28		33	67
3.	38	11	29	22	13	25	62	28	11	22		1	38			34	66
4.	27	13	26	34	8	37	55	35	15	15			27	22	1	43	57
5	48	19	24	9	23	5	72	8	8	3			48	24	9	28	72
6																	
7	50	10	31	9	12	51	37	10	1	8			50	31		18	82
8	53	41	1	5	25	3	72	23		25			52			2	98
9	53	8	2	37	36	56	8	29	10	8			53			94	6
10																	
11	47	28	9	16	20	49	31	18	2	20			47	13		30	70
12	51	10	34	5	33	22	45	9	4	6			51	30		19	81
13	43	23	32	2	18	40	42	8	15	3			43	30		1	99
14	39	36	17	8	31	44	25	40	16	5			39			13	87
TOTALS	540	215	270	175	248	426	526	226	86	140		1	539	211	11	329	871
AVG.	45	18	22	15	21	35	44	18	6	12		0	45	17	1	27	73

APPENDIX C

VISUAL QUALITY ASSESSMENT WORKSHEETS

SUMMER

LANDSCAPE QUALITY.

SCENE #	LANDFORM			VEGETATION			WATER			COLOUR			ADJACENT SCENERY			SCARCITY			CULTURAL MODIFICATIONS			TOTAL
	DOMINANT	NOT EXCEPTIONAL	LACKING	VARIETY OF VEGETATION	SOME VARIETY 1OR 2 SPECIES	LITTLE OR NO VARIETY	DOMINANT	NOT EXCEPTIONAL	ABSENT OR NOT NOTICABLE	VARIETY OR VIVID COLOURS DOMINANT	SOME VARIETY BUT NOT A SCENIC ELEMENT	SUBTLE, GENERALLY MUTED TONES	ADJACENT SCENERY GREATLY ENHANCES VISUAL QUALITY	MODERATELY ENHANCES OVERALL VISUAL QUALITY	LITTLE OR NO INFLUENCES ON OVERALL VISUAL QUALITY	MEMORABLE	DISTINCTIVE BUT SIMILAR	COMMON	FREE FROM INFLUENCES OR WILL ADD TO VISUAL QUALITY	SOMEWHAT DEPRECIATED BY INFLUENCES	MODIFICATIONS SO EXTENSIVE THAT SCENIC QUALITIES ARE MOSTLY NULLIFIED.	
	5	3	/	5	3	/	5	3	0	5	3	/	5	3	0	6	2	/	2	0	-4	
1			/			/			0			/			0			/		0		
2			/		3				0			/			0			/		0		
3			/		3				0			/			0			/		0		
4			/		3				0		3				0			/			-4	
5			/			/			0			/			0			/		0		
6			/			/			0		3				0			/		0		
7			/		3				0		3				0			/	2			
8			/			/			0			/			0			/		0		
9			/			/			0			/			0			/		0		
10			/			/			0			/			0			/		0		
11			/		3				0		3				0			/		0		
12		3			3				0		3				0			/			-4	
13			/			/			0			/			0			/		0		
14			/		3				0		3				0			/		0		
TOTAL	16			28			0			26			0			14			-6			78
MAX.	70			70			70			70			70			84			28			462
MIN.	14			14			0			14			0			14			-56			0

WINTER

LANDSCAPE QUALITY.

SCENE #	LANDFORM			VEGETATION			WATER			COLOUR			ADJACENT SCENERY			SCARCITY			CULTURAL MODIFICATIONS			
	DOMINANT	NOT EXCEPTIONAL	LACKING	VARIETY OF VEGETATION	SOME VARIETY 1 OR 2 SPECIES	LITTLE OR NO VARIETY	DOMINANT	NOT EXCEPTIONAL	ABSENT OR NOT NOTICABLE	VARIETY OR VIVID COLOURS DOMINANT	SOME VARIETY BUT NOT A SCENIC ELEMENT	SUBTLE, GENERALLY MUTED TONES	ADJACENT SCENERY GREATLY ENHANCES VISUAL QUALITY	MODERATELY ENHANCES OVERALL VISUAL QUALITY	LITTLE OR NO INFLUENCES ON OVERALL VISUAL QUALITY	MEMORABLE	DISTINCTIVE BUT SIMILAR	COMMON	FREE FROM INFLUENCES OR WILL ADD TO VISUAL QUALITY	SOMEWHAT DEPRECIATED BY INFLUENCES	MODIFICATIONS SO EXTENSIVE THAT SCENIC QUALITIES ARE MOSTLY NULLIFIED.	
	5	3	1	5	3	1	5	3	0	5	3	1	5	3	0	6	2	1	2	0	-4	
1			1			1			0			1			0			1		0		
2			1			1		3				1			0			1		0		
3			1		3				0			1			0			1		0		
4			1			1			0			1			0			1			-4	
5			1			1			0			1			0			1		0		
6 (NOT SHOT)																						
7			1			1			0			1			0			1	2			
8		3				1			0			1			0			1		0		
9			1		3				0			1			0			1		0		
10 (NOT SHOT)																						
11		3				1			0			1			0			1		0		
12			1			1			0			1			0			1			-4	
13			1			1			0			1			0			1		0		
14		3				1			0			1			0			1		0		
																						TOTAL
TOTAL	18			16			3			12			0			12			-6			55
MAX.	60			60			60			60			60			72			24			396
MIN.	12			12			12			12			0			12			-48			0

APPENDIX D

COMPARISON OF VISUAL CHARACTER WORKSHEET (SAMPLE)

Comparison of Visual Character.

Scene 1 Winter ✓ Summer ___

Existing landscape + Proposed Facility

LANDFORM / WATER	verbal Descriptor.
FORM. →	flat, disturbed part of berm seen. similar to disturb mounds, stack not similar
LINE. →	contrast. – not similar. (stack). [illegible] (berm).
COLOUR. →	~~contrast~~ · not similar. (stack) · similar (berm)
TEXTURE. →	~~contrast~~. stack : not similar. ~~ecsummto~~ similar · berm.

VEGETATION	
FORM. →	not similar.
LINE. →	similar to tree trunks (stack). berm similar ✓
COLOUR →	stack not similar ~~(contrast)~~ similar to berm (assumption plant immediately)
TEXTURE →	not similar (stack very similar. ~~to~~ (berms)

CULTURAL MODIFICATIONS.	
FORM. →	(stack. very similar (hydro poles) berm similar.
LINE. →	stack – strong vertical as ~~hydro~~ · poles- ~~contr~~ oblique – not similar to berm.
COLOUR. →	stack similar to road berm similar to spoil (disturbed earth)
TEXTURE. →	~~not~~ similar to road (stack berm similar to hydro poles.

APPENDIX E

HERITAGE LANDSCAPE REPORT

Appendix E: Heritage Landscape Report

Heritage Character of Landscape Around LF-9C

Background and Methodology

In early October, 1986, Bruce Cudmore of EDA Collaborative Inc. asked Christopher Andreae of Historical Research Limited for his opinion of the characteristics of the heritage landscape of the Ontario Waste Management Corporation's (OWMC) LF-9C site.

On October 7, Mr. Andreae conducted a "windshield survey" of LF-9C. Later he reviewed documentation prepared for the OWMC report **SITE SELECTION PROCESS PHASE 4A: SELECTION OF A PREFERRED SITE(S) - SOCIAL ANALYSIS; APPENDIX VOLUME 2: HERITAGE ASSESSMENT.** This work formed the basis for determining the character of the heritage landscapes of the LF-9C area. Suggested mitigation options were developed that would help minimize the impact of the proposed LF-9C facility on the heritage landscape.

Heritage Landscape Character

LF-9C and vicinity is a distinctively rural area. Heritage landscape components vary in intensity over the study area. Along much of Highway #20 the wide right-of-way, paved road, hydro poles, and a mixture of old and modern housing and farms are characteristic of a late 20th century rural landscape. On the other hand Gee Road between Highway #20 and Vaughan Road is evocative of a 19th century rural landscape. The gravel road is narrower than normal, there are no hydro poles and only one farmstead. Tree planting close to highway 20, however, appears to be recent.

Manifestations of Heritage Landscapes

1. Property Lines

   Almost all of the original farm property lot lines are still visible either as fence lines of lines of vegetation. Property fences have long been a feature of the area. By 1881 it was noted that 2/3 of all farms in Gainsborough Township were fenced. In the 1880s fences were either board fences or rail fences. None were noted in the field survey. Today, fences were wire mesh or barbed wire.

   While some farm consolidation has taken place and new fence lines built the early property lines are still visible. In some cases this line is marked only by a row of trees in a field.

Additional fencing from later periods marks new property boundaries or internal fencing.

2. Trees

Several types tree plantings contribute to the heritage character of the area.

Most prominent are large farm wood lots. These are generally located at the back of the farm, near the middle of the concession. Occasionally sections of woodlots like the road. As the land is quite flat, one can see great distances and the view often terminates in a scene of a wood lot.

Woodlots also help to delineate property and field lines. Woodlots stop abruptly at fence lines. Most have at least one pronounced right angle corner to the woodlot.

Most farms have plantings around the buildings either as wind breaks or for decoration. A few abandoned fruit orchards were also noted.

Trees, or lack of trees, beside roads is a third form of heritage tree planting. Along some roads such as the Silverdale Road, there were no road plantings. Along Highway #20 the trees were set far back from the road to conform to modern highway standards. Only in a few locations were trees planted parallel and close to the road to provide a canopy over the road. This planting is a distinctive 19th century concept that provided shade in summer and encouraged snow cover for sleighs in winter. One of the best examples in the area was noted along Vaughan Road at the southwest corner of the LF-9C site.

A fourth type of tree planting occurred along fence lines. Plantings varied from hedge rows to mature trees. It seem unlikely that this vegetation was deliberately planted but rather grew due to lack of cultivation at the fence. This could not be confirmed.

3. Architecture

All of Gainsborough Township had been settled by the 1840s. By 1880 2/3 of all housing stock was considered to be "first class frame" or brick. One third of the housing was log or "inferior frame".

No early settlement houses were noted; most buildings appear to date from the mid to late 19th century. No log structures were noted.

Much of the housing in the vicinity of LF-9C represented an upgrading of building stock rather than replacement. New windows and siding were common. Few houses were well maintained and reflected strong architectural elements.

New housing in the area represented a mix between farmhouse replacement and sub-divided property houses. There were small strip developments along Highway #20 of two or three units.

There were no historic commercial buildings in study area. New buildings consisted of a garage and a restaurant on Highway #20.

As with housing, agricultural buildings represented a wide variety of ages and styles. Most buildings date form the early 20th century to the present. Gambrel roof barns are a common style but many farms also have large modern steel barns. Unlike the subdued colour of wood, painted steel can be very colourful. Most farms have tall concrete or steel silos. Most of these appear to date from post World War Two. Low, early 20th century concrete silos were less common and no wooden silos were noted.

4. Farmscapes

A considerable number of early houses and farm units have been removed. In the 1870s LF-9C contained seven farm units of which 6 had houses and barns. Today only four of the farm units contain buildings of which only one contains a grouping of buildings that are distinctive of a working farm (E1/2 of lot 17, Con 3).

As indicated in the discussion on property lines, the small 19th century field boundaries are still visible. Some large field consolidation has occurred, particularly east of the LF-9C site.

In 1880 1/6 of the Township was considered "first class" land, 1/2 "second class" and the remaining 1/3 "third class" land. This ratio of land quality still seems to hold. Also in 1880 mixed farming was the main activity. Fall wheat and hay were most important but oats, pasture land and peas were also important. Crop types were not noted but mixed farming still seems to be the economic base of the area.

5. Roads

All roads are laid out in a grid iron pattern that follows the land survey of the area. The Silverdale Road at Concession 4 is an exception. A new alignment of curved has been constructed to avoid two sharp right angle bends.

Apart from Highway #20, all road right-of-ways in the area where of standard 66 foot width. The Highway #20 right-of-way has been widened over the 66 foot road allowance and consequently some old houses are close to the property line.

Except for the Gee Road between Highway #20 and Vaughan Road, all concession roads are maintained at a standard width of approximately 16 feet. The Gee road is narrower, with a road surface width of perhaps 12 feet. The Silverdale Raod and Highway #20 have much wider surfaces than the gravel road.

Road names in the area are monuments to settlers. For example Gee and Schram Roads are named after settlers in the area.

Hydro poles, a mid 20th century development, are found along on most roads but not, for example, along sections of the Gee Road.

Mitigation Options

The following suggestions are ways of maintaining or reintroducing heritage elements into the landscape of the LF-9C area.

1. Keep roads straight
   The area was historically surveyed on a grid iron pattern.
2. Plant shade trees close to road
   Deciduous trees were planted along concession roads to provide shade and encourage snow deposits.
3. Mixed farming
   This has been the dominant farming type since at least the 1880s.
4. Use fence lines
   Fences and remains of fence lines are still prominent in the area.
5. Use historic architectural elements
   Clap board and red brick are common building materials. 1 1/2 story houses is a common building size. Gambrel roofs were typically used on barns.

APPENDIX F

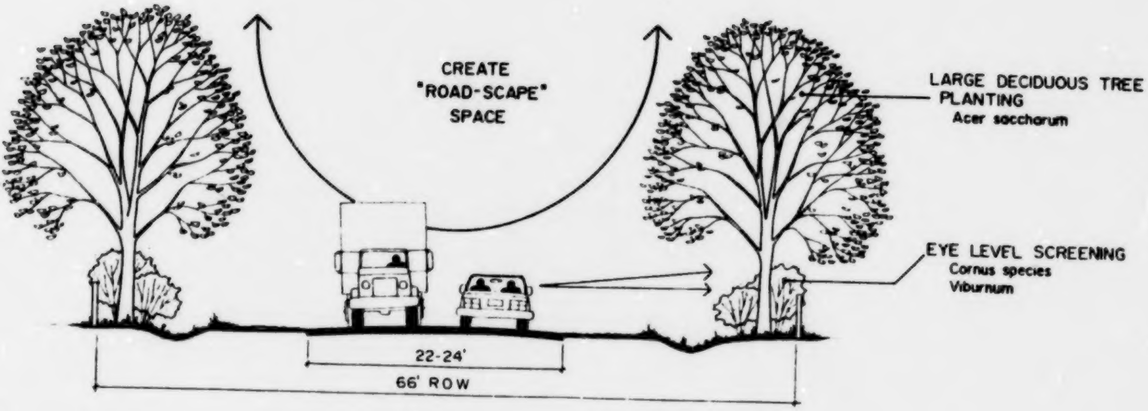
CONTRAST RATING SCORE (SAMPLE SHEET)

Scene 1
Summer.

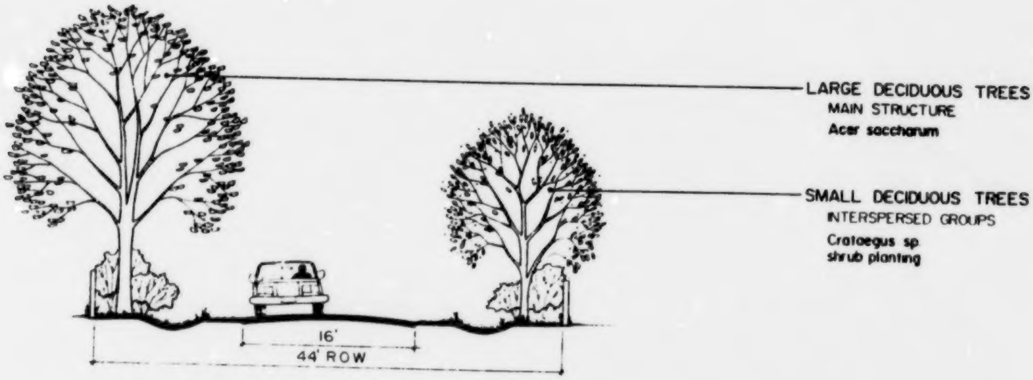
	ELEMENTS					Degree of Contrast.							
	Form	Line	Color	Texture		STRONG	MODERATE	WEAK	NONE		Rating for each element		Total Rating
Landform	4	3	2	1		3	2	1	0				
	4				×			1		=	4		
		3			×				0	=	0		
			2		×			1		=	2	=	7
				1	×			1		=	1		
Vegetation	4				×				0	=	0		
		3			×				0	=	0		
			2		×			1	[illegible]	=	2	=	3
				1	×			1		=	1		
Structure	4				×			1	[illegible]	=	4		
		3			×			1		=	3	=	8
			2		×				0	=	0		
				1	×			1	[illegible]	=	1		

APPENDIX G

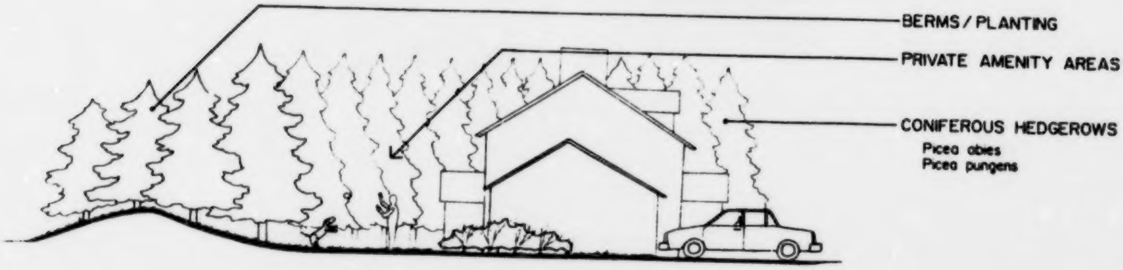
OFF-SITE MITIGATION TECHNIQUES


CREATE
"ROAD-SCAPE"
SPACE
LARGE DECIDUOUS TREE PLANTING
Acer saccharum
EYE LEVEL SCREENING
Cornus species
Viburnum
22-24'
66' ROW

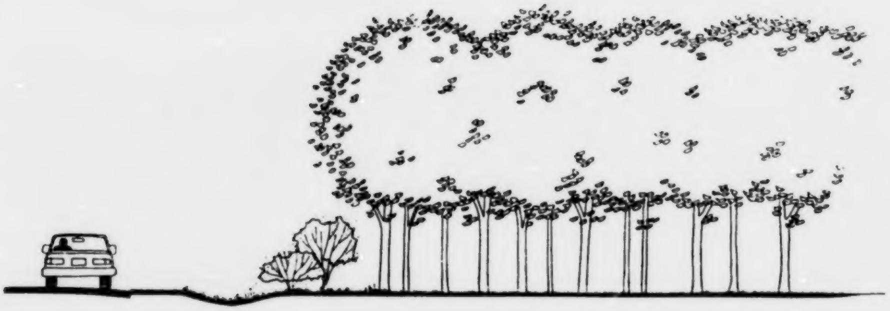
1. ROADSIDE PLANTING (HWY. 20)


LARGE DECIDUOUS TREES
MAIN STRUCTURE
Acer saccharum
SMALL DECIDUOUS TREES
INTERSPERSED GROUPS
Crataegus sp
shrub planting
16'
44' ROW

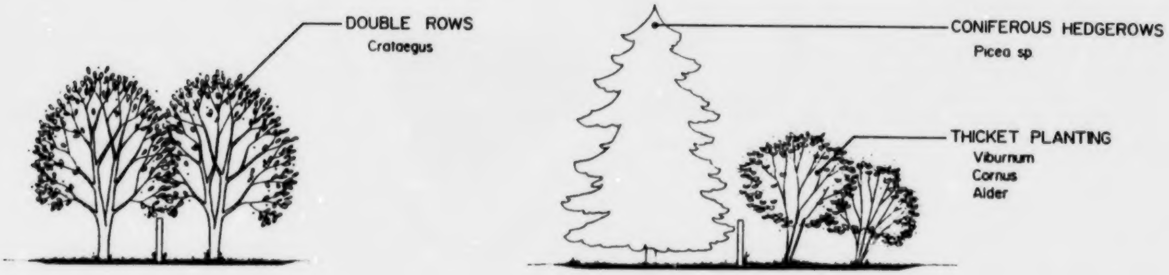
2. ROADSIDE PLANTING (CONCESSION ROADS)


BERMS / PLANTING
PRIVATE AMENITY AREAS
CONIFEROUS HEDGEROWS
Picea abies
Picea pungens

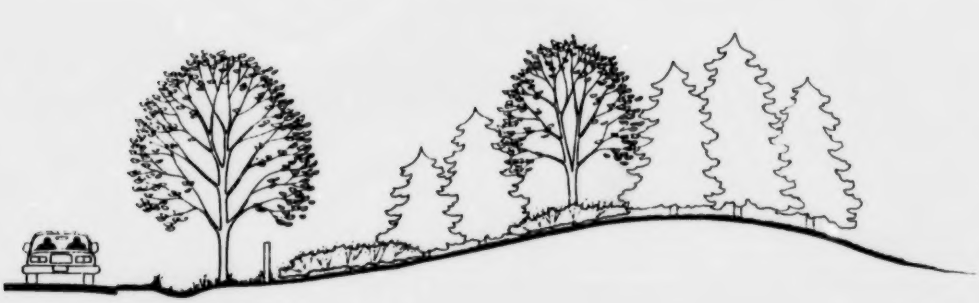
3. DWELLING AREA TREATMENT



4. WOODLOT PROTECTION / MANAGEMENT / CREATION


DOUBLE ROWS
Crataegus
CONIFEROUS HEDGEROWS
Picea sp
THICKET PLANTING
Viburnum
Cornus
Alder

5. HEDGEROW PLANTING



6. BERMS / PLANTING / AMENITY CREATION

APPENDIX H

FACILITY SIMULATIONS

REPRESENTATIVE
PHOTOGRAPHIC LOCATION NO. 2

SUMMER

VISIBLE FACILITY COMPONENTS

- Evaporation Stack
- Incinerator Stack
- Incinerator Plant
- Auxiliary Boiler Stack
- Drum Storage Building
- Solidification Plant
- Physical/Chemical Treatment Plant
- Administration Building
- Maintenance Building

WINTER

VISIBLE FACILITY COMPONENTS

- Evaporation Stack
- Incinerator Stack
- Incinerator Plant
- Auxiliary Boiler Stack
- Drum Storage Building
- Solidification Plant
- Physical/Chemical Treatment Plant
- Administration Building
- Maintenance Building

BEFORE MITIGATION

REPRESENTATIVE
PHOTOGRAPHIC LOCATION NO. 2

SUMMER

VISIBLE FACILITY COMPONENTS

- Evaporation Stack
- Incinerator Stack
- Incinerator Plant
- Auxiliary Boiler Stack
- Drum Storage Building
- Solidification Plant
- Physical/Chemical Treatment Plant
- Administration Building
- Maintenance Building

WINTER

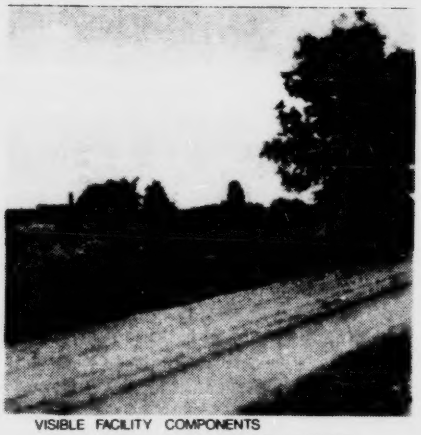
VISIBLE FACILITY COMPONENTS

- Evaporation Stack
- Incinerator Stack
- Incinerator Plant
- Auxiliary Boiler Stack
- Drum Storage Building
- Solidification Plant
- Physical/Chemical Treatment Plant
- Administration Building
- Maintenance Building

AFTER MITIGATION

REPRESENTATIVE
PHOTOGRAPHIC LOCATION NO. 3

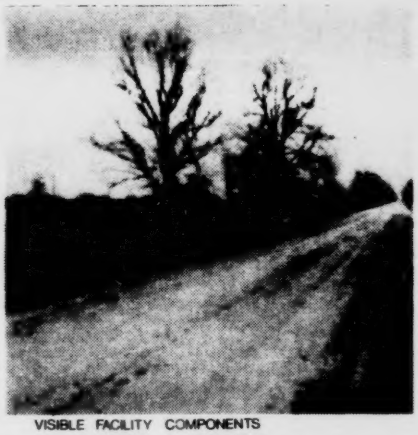
SUMMER



VISIBLE FACILITY COMPONENTS

Evaporation Stack
Physical/Chemical Treatment Plant
Truck Wash Station
Organic Drum Storage and Handling Building
Incinerator Plant
Maintenance Building

WINTER



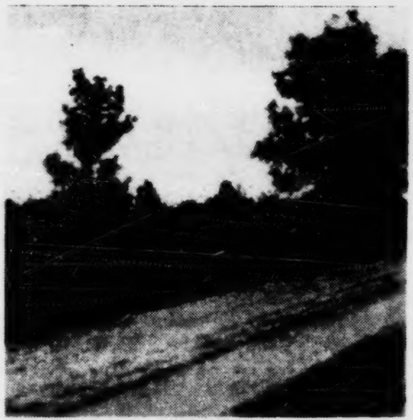
VISIBLE FACILITY COMPONENTS

Incinerator Stack
Incinerator Plant
Sanitary Sewage Plant
Raw Water Treatment Plant
Incinerator Tank Farm
Organic Drum Storage and Handling Building
Maintenance Building

BEFORE MITIGATION

REPRESENTATIVE
PHOTOGRAPHIC LOCATION NO. 3

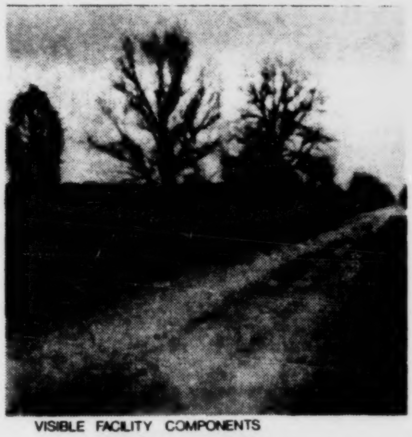
SUMMER



VISIBLE FACILITY COMPONENTS

Evaporation Stack
Physical/Chemical Treatment Plant
Truck Wash Station
Organic Drum Storage and Handling Building
Incinerator Plant
Maintenance Building

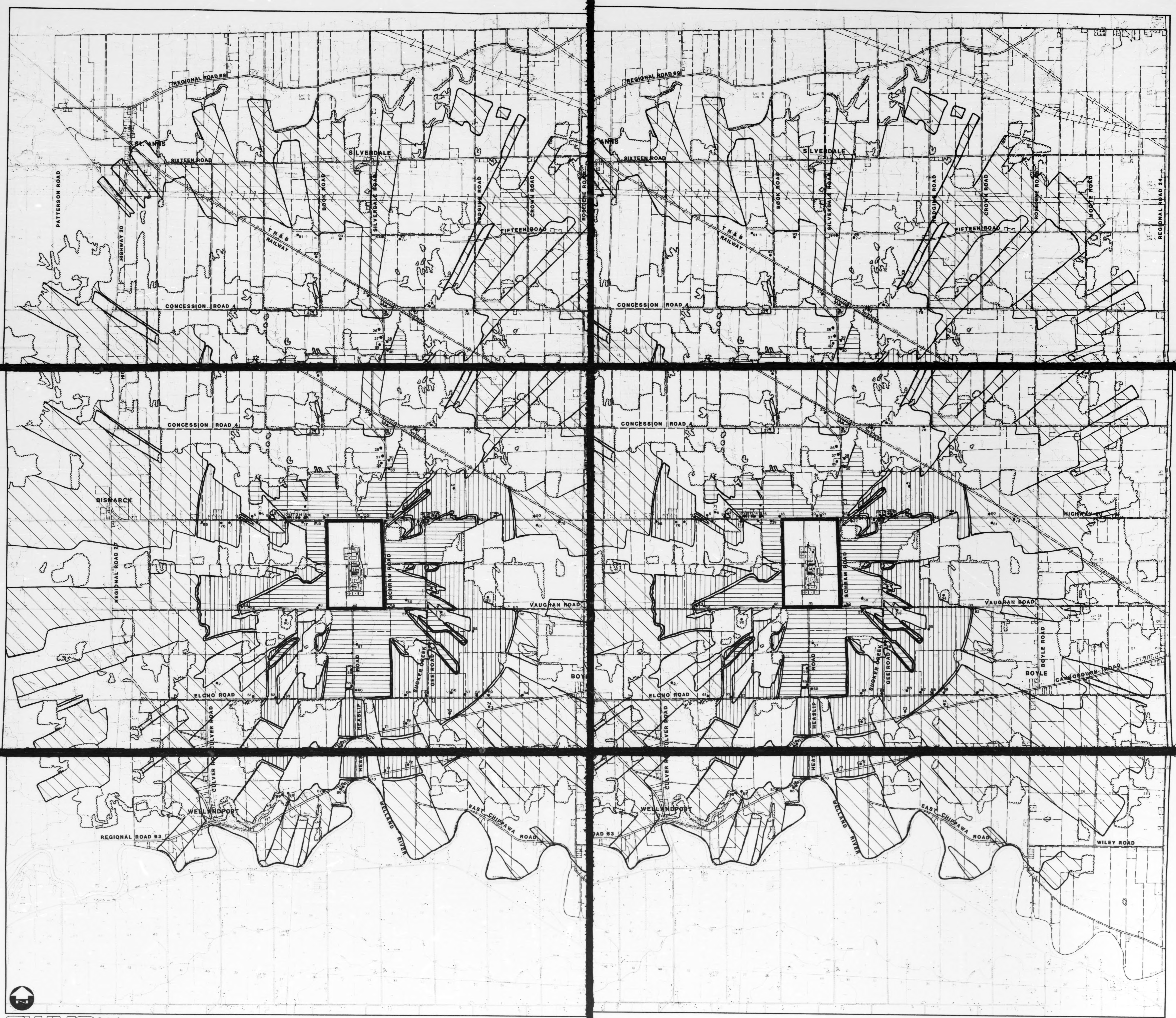
WINTER



VISIBLE FACILITY COMPONENTS

Incinerator Stack
Incinerator Plant
Sanitary Sewage Plant
Raw Water Treatment Plant
Incinerator Tank Farm
Organic Drum Storage and Handling Building
Maintenance Building

AFTER MITIGATION


REGIONAL ROAD 69
ST. ANNS
SIXTEEN ROAD
SILVERDALE
PATTERSON ROAD
HIGHWAY 20
BOOK ROAD
SILVERDALE ROAD
HODGINS ROAD
CROWN ROAD
ROBERTSON ROAD
MOOTE ROAD
REGIONAL ROAD 24
FIFTEEN ROAD
T.H.&B. RAILWAY
CONCESSION ROAD 4
BISMARCK
REGIONAL ROAD 27
SCHRAM ROAD
VAUGHAN ROAD
HIGHWAY 20
BOYLE
BOYLE ROAD
CANBOROUGH ROAD
ELCHO ROAD
SUCKER CREEK
GEE ROAD
HERSLIP ROAD
CULVER ROAD
WELLANDPORT
REGIONAL ROAD 63
WELLAND RIVER
EAST CHIPPAWA ROAD
WILEY ROAD

OWMC Ontario Waste Management Corporation

Consultant:

EDA COLLABORATIVE INC.

Landscape Architecture • Urban Design • Environmental Planning • Tourism Design

POTENTIAL VISUAL IMPACT ZONES

Legend:

▬	Site Boundary
•21	Residence

Visual Impact

▤	High
▥	Moderate
▨	Low
☐	No Impact

Scale 1:20,000

500 0 1,000 1,500

Figure 9